THE IRON AGE

A Review of the Hardware, Iron, Machinery and Allied Trades.

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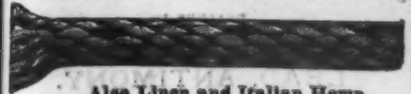

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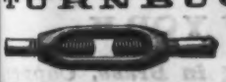

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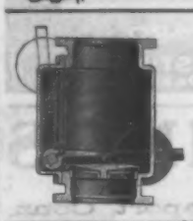

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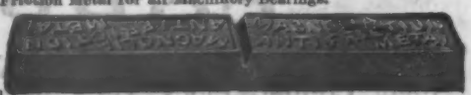

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THE IRON AGE

THURSDAY, JUNE 9, 1904.

The Hudson River Tunnel.—II.

A Comparison of the Original Methods with Those Now Employed.

BY S. D. V. BURR.

(*Conclusion.*)

The New York & Jersey Railroad Company, with W. G. McAdoo as president and Charles M. Jacobs as chief engineer, acquired the franchise and property of the original Hudson Tunnel Railroad Company in the early part of 1902. Since then the work has been carried forward without undue trouble, the north tunnel has been opened from shore to shore and operations have been begun on the approaches.

The most important change made by the English engineers, after the introduction of the shield, was the substitution of heavy cast iron plates for the masonry. The light boiler plates used in the early work were never considered as being an integral and permanent part of the cylinder; they only served to keep the silt out until the masonry had been laid, after which their existence was of no moment.

The plates in the south tunnel, which has been reduced in inside diameter to 15 feet 3 inches, are 6½ feet long, 2 feet wide, 1 7-16 inches thick, 8 inches deep through the webs, and the flanges are 1½ inches thick. All the bolt holes are 1½ inches. The sides of each plate are accurately faced, the long ones being in a plane at right angles with the axis of the tunnel and the short ones on a radius, so that they fit together with the greatest nicety. An inspection of Fig. 8, which shows the first work done under the present management, will convey a comprehensive idea of the regularity and precision of the work. With these plates it is impossible to distort the circular section of the tunnel, and with the shield it is easy to follow the exact grade and alignment.

The change in diameter was brought about by the alteration of the use to which the tunnel is to be put. While at first intended for regular steam traffic, it will now be employed only for trolley and light service. The same plan would have been adopted with the north tunnel but for the fact that the heading when the present management assumed control was at the lowest point, with but a few feet of silt overhead. With these surroundings it was not thought expedient to reduce the diameter of the shield.

The Shield

consists of a steel cylinder somewhat larger than the outside diameter of the tunnel, and provided with a central and a forward vertical partition. Between the partitions are small chambers in which the men stand while digging the silt through openings in the front and throwing it through openings in the rear. The advance end of the cylinder is in the form of a cutting shoe, which enters the silt as the shield is forced forward by hydraulic rams resting against the completed part of the tunnel. The shield covers the entire heading and overlaps a part of the permanent work. It resembles a cap in that it covers and protects the whole heading, and is the direct opposite of the first plan with the silt all exposed.

Fig. 8.—North Tunnel, Showing Commencement of New Work, April, 1903.

The shell of the shield is of ⅝-inch steel, 19 feet 5¼ inches outside diameter and 10½ feet long. Between the two partitions are 9 working chambers, formed by 2 vertical and 2 horizontal walls, which are spaced 6 1-3 feet. In each chamber the upper edge of the forward opening is lower than the lower edge of the inner opening, so that so long as an air pressure is maintained equal to the hydrostatic head it is impossible for the water to enter the heading.

The plates, being much too heavy to be handled by manual labor, are placed in position and held until bolted to those already in place by an erector, shown in the center of Fig. 9, which is operated by hydraulic power. The arm is mounted on a shaft so as to swing in a circle

perpendicular to the axis of the tunnel. In operation the outer end of the arm grasps a plate, swings it to the required location and then forces it out to its seat, where it is held until the bolts have been inserted. The device is extremely simple, and works easily and rapidly.

This system of tunneling, in direct contrast with that first employed, provides absolute safety for the men. Moreover, a blowout, of more or less frequent occurrence during the early progress of the work, cannot happen, and the flooding of the heading could only take place through the complete disablement of the air compressing plant. With these advantages there is the additional one of greater rapidity in construction, with the accompaniment of less labor, and therefore reduced cost.

After leaving the river bed the two tunnels will converge into a double arch concrete-steel tunnel, 17½ feet center to center, and each having a roof with a radius of 7½ feet. This tunnel opens into a 3-track single tunnel, also built of concrete steel, which extends to the ter-

Fig. 9.—Erector of Plates.—North Tunnel, Looking West Toward Erector, Iron Joining Old Brick Work, April 19, 1904.

minus at Christopher and Greenwich streets. The shore work will all be done in open cut.

The photograph Fig. 8, for which and for Fig. 9 we are indebted to the courtesy of the chief engineer, Charles M. Jacobs, was taken at the meeting point of the shield and the masonry built 20 years ago from the New York caisson. It will be seen that the shield meets the brickwork almost exactly in line, after having come nearly a mile from the New Jersey shaft, and having been 25 years making the distance.

Turbines and the British Board of Trade Survey.

LONDON, May 28, 1904.—A decision relating to the construction of turbine steamers was yesterday issued by the Court of Survey in Glasgow on an appeal by William Denny & Brothers, the shipbuilders, of Dumbarton. The facts briefly set out are as follows: The "Princess Maud," built by Denny & Brothers, is a turbine ship. The turbine engines are provided by Messrs. Parsons and built by them at their own works. What they built and supplied to Denny & Brothers stopped at the condensers; that is to say, the propelling power was provided by Messrs. Parsons from their own works, and no questions arose with regard to it. The turbines were delivered to Denny & Brothers, and had to be fitted to the vessel, and the minor parts of the machinery provided by Denny & Brothers and attached by themselves included the condensers required for the turbines. The question between the Board of Trade and Denny & Brothers had reference to the condensers and to their sufficiency for what was required of them.

The Messrs. Denny took up the position that the Board of Trade were not entitled nor justified in demanding a certain test before the condensers were passed with a view to the certificate which was necessary for a passenger vessel. The certificate is issued by the Board of Trade, but as a precedent there was required to be made a declaration by the shipwrights' surveyor and the engineers' surveyor who had the vessel under survey. The Board of Trade had given certain instructions to their surveyor with which he was required to comply, but the Messrs. Denny refused the necessary facilities, and the certificate accordingly was refused. The question which the Court had to try was whether headquarters had the right to give its surveyors such directions, and whether those were competent and reasonable. The question arose because they were dealing not with ordinary engines, but with turbine machinery, experience of which had not been yet sufficient to enable the Board of Trade to lay down the same simple series of regulations as with regard to the engines to which shipbuilders had been accustomed for many years.

The Court sustained the appeal, and pointed out that this test is a new departure in survey practice, and that, as the Board of Trade was the party proposing to depart from use and wont, it lay upon them to show that there were new circumstances justifying a new departure. Considerable importance attached to this point, as it was admitted that if the Board of Trade's action was approved, this requirement would become a precedent for turbine steamer surveys in future, and would place turbine steamers at a disadvantage compared with ordinary steamers. The Court, however, find that the test is unreasonable. They point out that, while the Board of Trade have a great duty to the traveling public, they also have a responsibility to the shipbuilding and allied industries, and must not in their zeal for the public safety unnecessarily impose restrictions on an industry, and especially an industry in its development stage. S. G. H.

The International Acetylene Association will hold its next regular annual convention September 14, 15 and 16 in the Lecture Hall of the Palace of Education, World's Fair Grounds, St. Louis, Mo.

The William Cramp & Sons Ship & Engine Building Company.

In last week's issue we gave a brief extract from the annual report of the William Cramp & Sons Ship & Engine Building Company, Philadelphia, showing the financial operation of the company for the year ending April 30, 1904. From the official copy of the report, since received, we take the following extracts from the address to the stockholders by President Henry S. Grove:

"The income account for the year shows net earnings from all the company's operations and interests of $188,174.31, but it must be borne in mind that under the terms of several of the mortgages against your property and the conditions under which the $5,000,000 of collateral notes were issued, we are required to pay considerable money each year toward the liquidation of our indebtedness, and as we have no means of refunding these repayments, we must look to our earnings for the means of meeting them each year. It is, therefore, satisfactory to find that your net earnings for the year have been sufficient to enable us to meet these payments without encroaching on your working capital.

"The efficiency of your plant and its condition are well evidenced by the fact that during the past fiscal year it has been necessary for us to invest in new tools and machinery for all the companies only $9940.41.

"Its resources under our improved practice and less costly methods indicate it is equal if not superior to any other shipyard in the country. If we may take as our guide the report of the United States Navy Department for the month of May, showing the progress made at all shipyards in the United States where Government work is being done, your company are building ships faster than any other yard, both as regards any single ship or the average progress on all ships in their care. We believe that with the saving of time it is fair to hope that there will be a saving of money and an increase in your profits.

"The past year indicates that there has been little or no profit in shipbuilding proper. Were it not for our subsidiary companies doing business other than that of building ships, we would not be able to make the showing on the previous pages.

"Your I. P. Morris Company are in the first rank among those undertaking high service turbine work throughout the country, and the indications are that, with the forced economies necessitated by the present unpromising business conditions, a considerable volume of this class of work will be presented during the present year; this, together with their reputation for high grade general machine work, has contributed much in the past year to the profits of your company and promises, notwithstanding the decreasing demand, to make a satisfactory showing for the present year.

"The Kensington Shipyard has also contributed greatly to your profits in the past, and we see no reason why its prospects are not as good for the future; for even if new ships are not built, existing ones will need repairs. Your brass foundry has had the most prosperous year in its history, and its specialties are meeting with constantly increasing favor.

"Nowhere throughout the great field of commercial activity have the enterprise and energy of the people created such an overproduction of facilities as in shipbuilding. A single shipyard (Cramps) can build promptly, without retarding their other contracts, all the war vessels authorized by the last Congress.

"The amount of business offering is only a small fraction of the capacity of the various yards, and competition is so keen that the margin of profit is practically eliminated. This applies quite as fitly to mercantile work as to Government work. While the agitation in Congress and the favorable interest of a large number of our citizens give promise of legislation that may induce an increase in the volume of business, there is nothing in sight in the immediate present that promises any better returns than the work we now have on hand. Our position for the coming fiscal year, however, is secure in having in all departments contracts aggregating about $13,000,000, which is an increase over the same period of last year of $1,500,000."

Pacific Coast Trade.

SAN FRANCISCO, CAL., May 28, 1904.—While it is as yet too soon to state exactly what may be the true condition of the cereal crops of the State, it is tolerably certain that they will not come up to earlier expectation, particularly as regards wheat, of which we had at one time prospects for 900,000 tons. The hot winds of the past week have done more or less damage in the Sacramento and San Joaquin valleys. The estimates as to the outcome are varying, some claiming that the yield of wheat this year will not exceed 500,000 tons. This, if true, would make the condition of our wheat farmers in some portions of the State unfortunate indeed. As it is, a great many will suffer from this cause, especially in the Sacramento and San Joaquin valleys, and they will not make the improvements that they had contemplated. This, of course, would give a setback to the hardware and agricultural implement business in the midland sections of the State. Barley has suffered somewhat, but not to as great an extent as wheat, while fruit, on the whole, will give large yields. This is more particularly true of grapes, and we will have a big vintage and a large raisin pack. The citrus fruit growers are suffering from the untoward circumstances that attend the marketing of their product, and trade in citrus sections will not be as good as it should be when we consider the size of the crop. There are thus many drawbacks this year that were not so evident six weeks ago.

In the leading cities of the State the hardware, iron and steel business will probably be better than for a long time. Building activity is unprecedented in San Francisco, Los Angeles and other large cities. In one week here in San Francisco the total value of building contracts exceeded $500,000, much larger than that of any previous year at this time. For some time the value has been steadily increasing week by week. From Los Angeles come similar advices. All this will do much to offset drawbacks elsewhere complained of. In fact, the trade of this year among the hardware firms of San Francisco, if we can judge by the volume of the semimonthly collections of some, will come up to $15,000,000 or $16,000,000. This not only includes California trade, but also the export business and that with Hawaii and Alaska, the Philippines, &c. The trade with Alaska is especially good, and it looks as if it would keep on improving. These figures take in not only hardware, but iron and steel, iron pipe and oil well supplies. They do not include machinery and a few other articles such as bicycles, sewing machines, &c., which, though dealt in to some extent by our big hardware houses, in the main form specialties and would add some millions more to these figures.

In the matter of oil well supplies there is likely to be a large increase this year. It is certain that the production of oil will greatly exceed that of 1903. There are a couple of pipe lines about to be built which will take large quantities of pipe and other supplies, as both together will have a length of 230 miles. The lumber mills of the State have started in to produce and ship at a rate hitherto unprecedented, and will be buying heavily of saws, machinery, &c. The number of mills is being increased. On one new purchase at least $200,000 will be spent on machinery, to say nothing of other supplies before the year is out.

Heavy shipments continue to the Orient on account of the Japanese Government. The steamer "China" took out 508 tons of steel rails, valued at $17,000; machinery, $17,590; bicycles, $5110; car bodies, $1470, making with other articles a total of $42,000. To China the shipments were, on the whole, very light, as indeed they have been almost since the opening of the war. Exports of machinery to Australia have been large, and there have been good shipments of iron pipe and machinery to the Hawaiian Islands. J. O. L.

Plant of the Standard Forgings Company.

What is claimed to be the most complete plant in America devoted to the manufacture of heavy forgings has recently been completed by the Standard Forgings Company at Indiana Harbor, Ind. The company have acquired a 12-acre tract of land, consisting of a strip 240 feet wide and 2500 feet long, adjoining the Indiana Harbor Railway, which is a belt line giving access to all the roads entering Chicago. The buildings are of steel construction, consisting of a main building, with L's or annexes. The main building is 80 x 500 feet, 32 feet high to the eaves and about 50 feet to the comb. The engine room is 60 x 100 feet; axle room, 50 x 165 feet; scrap room, 50 x 100 feet.

The company are making a full line of heavy forgings, having machinery and facilities for turning out the largest crank shafts. At present the bulk of their product goes to concerns making Corliss engines, pumping, conveying and mining machinery and machine tools. They are also doing a large business in iron car axles. Their iron car and locomotive axles are made from No. 1 railroad wrought scrap, selected with the greatest care by experts. They also make steel car and locomotive axles and other steel forgings from open hearth billets.

Fig. 1.—Scrap Cutting and Sorting Department.

In the main building a Pawling & Harnischfeger three-motion electric crane with 15 tons capacity and 50 feet span travels on a track the entire length of the building, serving all the hammers and furnaces. This crane has a speed of from 250 to 350 feet per minute, a trolley speed of from 100 to 150 feet per minute, and a hoisting speed of from 16 to 40 feet per minute.

Handling the Scrap.

Carloads of railroad wrought scrap are received along the southern side of the building and are unloaded direct from the cars into bins, where they are carefully sorted. The scrap is then cut up to lengths for piling on two Thomas Carlin & Sons Company's shears, one having a capacity for cutting up to 2¼-inch square and the other up to 4-inch square. A view of this department is shown in Fig. 1. From the shears the scrap is conveyed to piling tables, where a corps of men and boys make it up into piles of about 300 pounds each. These piles are trucked to a table just opposite the first furnace and are conveyed into the furnace by a long shovel or peel that swings on a overhead crane. Sixteen of these piles may be charged into the furnace at a time, where they are reduced to an incandescent mass in about 30 minutes' time. A swinging jib crane conveys the heated piles to the 6000-pound double-frame Bement steam Miles hammer. This hammer is on the vertical steam driven principle and was built by the Niles-Bement-Pond Company. Its cylinder is 20 inches diameter; its length of stroke, 54 inches; die face, 14 x 25 inches. The hammer weighs 90,000 pounds. By this hammer the pile is reduced to a slab and the slab is conveyed on trucks to the next series of furnaces, known as axle furnaces. Three such slabs are assembled, one on top of the other, and heated in the axle furnaces, and when heated are transferred to the helve type axle hammer shown in Fig. 2. This hammer was constructed by the Standard Forgings Company themselves after plans suggested by Carl Jernberg, their superintendent. It is heavy in construction and rapid in operation, and is believed by the company to give exceptional homogeneity and strength to the axles forged under it. Two other hammers of the same size and type are being installed. It requires two heats to form an axle complete, and, as will be seen by the illustration, there are three grooves in the dies, one of which is for the general reduction of the billet, a second for tapering the axle, and the third for swaging.

Fig. 3 illustrates the heavy forging department, with its 8000-pound Bement-Pond vertical double frame steam hammer. This hammer weighs 112,000 pounds and has a standard die face 17 x 28 inches. Its cylinder is 24 inches in diameter, and stroke 60 inches. The illustration shows a shaft 14 inches x 14 feet being forged under this hammer. Serving the hammer are two Whiting Foundry & Equipment Company's steel cranes for hoisting, one 10 tons and the other 15 tons capacity. A feature of these cranes is the fact that they are supported independently of the frame work of the building by means of the special rigging which is indicated in the engraving.

A 3300-pound Bement-Miles single frame long stroke rapid action steam driven hammer is used on smaller forgings. The hammer has standard die face, 10 x 16

inches; 42-inch stroke and 15-inch diameter cylinder, and weighs 53,000 pounds. A small 800-pound quick action single frame Bement-Miles hammer, weighing 14,000 pounds, is also in use for the smallest work.

Fig. 2.—View of the Forge Shop, Showing Heavy Special Helve Hammer.

Fig. 3.—View of the Heavy Forging Department, Showing Double Frame Steam Hammer and Special Jib Crane.

Finishing the Axles.

The axles, after being allowed to cool on racks adjoining the hammer, are carried by the overhead crane to the axle room, where they are placed on racks. In this room are four machines for cutting to lengths and one centering machine, all furnished by the George Whiting Company, Chicago. Axles that require to be turned on their journals and wheel seats are put on racks and thence transferred to two A No. 2 or No. 3 Niles double head axle lathes, according to the character of work that is to be done. These lathes are served by light trolley hoists, which permit of the speedy handling of the axle. Axles that are to be shipped smooth forged and not machined are loaded direct onto cars on the switch track at the end of the building. All the machines in this room are driven by Milwaukee motors, two motors serving four cutting off machines and the centering machine.

In the heavy machine shop at the western end of the building are contained, among other tools, a 48-inch triple geared Pond forge lathe, that has a capacity for finishing up to 32 feet long and 48 inches in diameter; two 36-inch Pond triple geared engine lathes, with 12-foot beds; a 24-inch Niles engine lathe, and a 48-inch Pond planer that planes 49 inches wide, 49 inches high and any desired length, as well as a 26-inch Acme back geared crank shaper.

The power house contains a 100-kw 250-volt Milwaukee generator, direct connected to a McEwen engine. This engine supplies power for all the machinery, as well as for the arc and incandescent electric lighting of the plant. Individual motor drive prevails throughout the plant for operating machine tools, and consists of four 7½ horse-power 220-volt Milwaukee motors, direct connected to lathes; four 15 horse-power Milwaukee motors, operating planer, cut off and miscellaneous tools, and one 5 horse-power Milwaukee motor operating axle testing machine. The cranes are also operated electrically. The latest and most improved electrical devices for the protection of machinery and men prevail throughout the plant. The entire electrical equipment was installed by Kohler Brothers, Chicago.

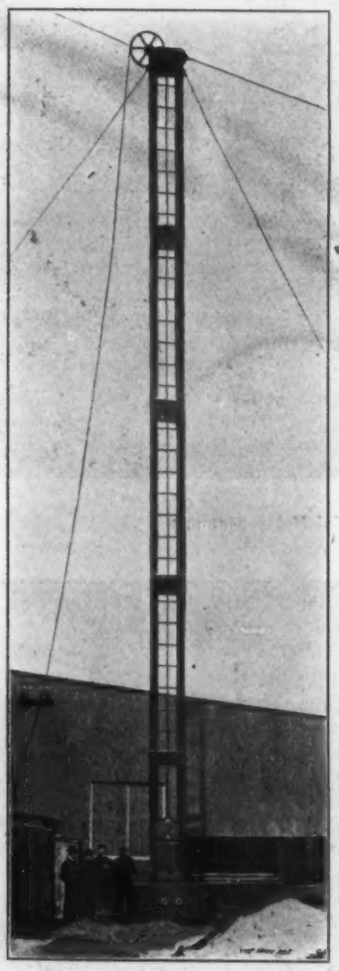


Fig. 4.—The M. C. B. Device for Testing Axles.

In the power houses are also three heavy slow speed Marsh pumps for supplying feed water to the boilers and cold water to the hammers.

In the same annex the company's machine shop is located. It contains a No. 4 Miles vertical drilling machine, a 14-inch slotting machine, besides small drills, lathes and other tools required for making dies and performing routine repair work.

Waste Heat Boilers.

To each of the ten heating furnaces in use in the plant is connected an Atlas tubular boiler. The boiler equipment consists of five 72-inch x 18-foot, with 70 4-inch tubes, rated at 150 horse-power; four 72-inch x 16-foot, with 70 4-inch tubes, rated at 125 horse-power, and one 60-inch x 14-foot, with 62 3½-inch tubes, rated at 75 horse-power, making altogether 1325 horse-power. These boilers are erected with the usual brick settings, but without grates, the hot flames coming to them from the heating furnaces through brick conduits or tunnels. All ten boilers are connected to a steam main, which in turn is connected to the steam hammers direct and to the engine in the power house. The furnaces themselves are equipped with No. 38 Dixie fans, built by the American Blower Company, which furnish the necessary blast.

Testing Device.

In the yard adjoining the axle room has been erected an M. C. B. testing device, illustrated in Fig. 4. This device consists of a rigging 50 feet high, in which is raised a 1640-pound weight a hight of 43 feet at the maximum, and this weight is dropped on the axle to be tested, which is suspended between points on the anvil having 3-foot centers. The radius of the trip in the direction of the axle is 5 inches. The anvil at the base of this device weighs 17,500 pounds and rests on 12 heavy double coiled helical springs. In testing it is the practice of railroad inspectors to require five blows of this hammer on axles for cars of 80,000 pounds capacity and seven blows on axles for cars of 100,000 pounds capacity. This testing apparatus was built after M. C. B. specifications by the Whiting Foundry & Equipment Company of Harvel, Ill.

The capacity of the Standard Forgings Company's plant is approximately 100 tons of finished forgings per day. By the use of extraordinary heavy hammers, speeded high, forgings of a maximum strength are secured in the minimum number of heats. In supplying materials for forgings of a given size it is the practice of the company to leave an unusually large margin for crop ends, thus securing solidity at the ends of the forging.

The Management.

The Standard Forgings Company consist largely of men who have had lifelong experience in this class of work. The president and treasurer, Frederick M. Steele, was formerly president of the Chicago Forge & Bolt Company, Chicago, and the vice-president and general manager, George E. Van Hagen, was for 15 years with the same company. Carl Jernberg was for 20 years with the Chicago Forge & Bolt Company, Chicago; George O. Roberts, secretary, was formerly with the American Car & Foundry Company; E. W. Richey, the sales agent, has also had long experience in the forgings line. One hundred and fifty men are now employed in the plant. The plant was constructed and equipped under the supervision of Superintendent Jernberg. The foundations for the main building were laid late last fall, and while it had been the intention of the company to start operations in January or February of this year, the work of building and equipment was delayed by the extremely cold weather. A. R. Clark & Co. of Chicago were general contractors.

Drawback on Steel Measuring Tapes.—The Treasury Department has prepared regulations for the allowance of drawback of duty paid on imported strip or ribbon steel used in the manufacture of measuring tapes, upon the application of the L. S. Starrett Company, Athol, Mass. It is announced that on the exportation of steel measuring tapes, 25, 50, 75 and 100 feet in length, inclosed in metal or leather cases, manufactured with the use of none but imported strip or ribbon steel not less than ⅜ inch in width and 8-1000 inch in thickness, a drawback will be allowed equal in amount to the duties paid on the imported strip or ribbon steel so used, less the legal deduction of 1 per cent. In liquidation, the quantity by weight of the imported strip or ribbon steel which may be taken as the basis for the allowance of drawback may equal the quantity declared in the drawback entry as actually consumed in the manufacture of the exported steel measuring tapes, less 1 per cent. of such weight, to be deducted as representing the value of the waste experienced in such manufacture, but in no case shall such quantity, to be taken as the basis for liquidation, exceed 4.455 ounces for each 25-foot tape; 8.663 ounces for each 50-foot tape; 12.633 ounces for each 75-foot tape, or 16.583 ounces for each 100-foot tape.

The Keller Electrical Steel Process.

The Keller process is described in a recent issue of the *Eisen-Zeitung*, and it is claimed for it that it works successfully, with good practical results, in some French works. Its characteristic feature consists in that it is carried on in intimate connection with a blast furnace which is distinguished from the ordinary blast furnace by the use of electricity to produce the heat required in the reduction of the ore. The iron produced in this furnace is tapped and run directly into an electrical refining furnace, where it is refined in a manner similar to that used in the Heroult process, from which, however, it differs in some essential points. The process is practiced with good satisfactory results at Kerrousse, near Hennebout, France, by the Compagnie Electrothermique Keller, Leleux & Co., as well as in some other places in France.

It was only after a series of rather unsuccessful trials, in which the inventor endeavored to reduce the ore and to refine the iron thus obtained in one and the same electrical furnace, that Keller finally decided to divide his process into two distinct operations, which consist, as already stated, in reducing the ore electrically in a kind of a blast furnace and then refining the resulting iron in another electrical furnace.

The first or reducing furnace, standing on a somewhat higher level, might roughly be compared with a round open hearth furnace, forming the crucible of a cupola, built on top of its roof, the inside of the cupola being much smaller than the inside of the open hearth furnace and narrowing down toward its top.

Thus the inside of the lining widens out from the top of the cupola downward gradually until it reaches the top of the crucible, where it widens out very suddenly. This arrangement facilitates the descent of the ore and prevents any possible hanging. The whole furnace is inclosed in an iron shell, and is lined with the best quality of hard firebrick. An air space is left between the iron shell and the lining in order to prevent any undue loss of heat. The ore is charged at the top through a charging apparatus so built as to prevent any air from entering the furnace during the charging operation.

Powerful carbon electrodes, whose lower ends penetrate the roof of the crucible part, into which they reach, are placed all around the furnace. The electrical arcs, developing between these big electrodes, reduce the ore and melt the iron. In one plant Keller, instead of placing the electrodes all around the furnace, arranged them in two groups, with two pairs of electrodes in each group. In this arrangement the upper pair of electrodes acts on the ore contained in the cupola, while the lower pair again penetrates the roof of the crucible to act on the ore and iron contained therein. The bottom of the furnace is slightly inclined toward the tap hole on one side. On the opposite side, on a somewhat higher level, is placed a slag hole.

The furnace is charged like a blast furnace, with a mixture of ore, coke and flux. The carbonic oxide devoloping in the lower part rises through the burden, dries it, and near the top is sucked into a special chamber, where it is burnt, and the products of combustion are further utilized for drying purposes. The process is continuous. The iron and slag are regularly tapped at intervals of several hours, and the furnace is kept filled by the addition at the top of fresh supplies of ore, fuel and flux.

The iron is tapped and run directly into the previously heated refining furnace. Here the electrical current is carefully regulated and the refining is carried through by means of ore. Sometimes pig scrap, mixed with lime, is added and a suitable slag is made.

Four powerful parallel electrodes, passing vertically through the roof of the refining furnace, plunge into the slag, but do not reach far enough down to touch the liquid metal. The refining takes place rapidly. Fifteen to 20 tons of iron are refined in one operation. After the metal is refined the current is kept on for a time sufficiently long to make the metal quite hot and liquid. After that it can be got rid of in the usual way, either casting it into ingots or using it in the manufacture of steel castings. Keller makes the refining process also continuous in that after he has tapped off the metal he keeps the furnace hot with a reduced electrical current until he can receive the next cast from the reducing furnace. By mechanical means he has further made it possible to change the electrodes without stopping the operation.

At Kerrousse water power is used to generate the electrical current. It is claimed that with the use of steam the cost of the electricity would become too high, owing to the fact that a large amount of electricity has to be used and wasted to overcome the great resistance offered by the slag to the passage of the electrical current.

At the Kerrousse plant there are available 550 horsepower. There have been built two turbines of 135 horsepower each, operating two generators of 200 kw. capacity.

In another plant built by Keller at Livet there are available 25 c. m. of water per second, with an aggregate fall of 60 m.*

In the last named plant turbines are used to generate a current of 30,000 amperes in single phase alternate current machines. They can produce, including the power required in all preparatory work, about 8 gross tons of steel in 24 hours.

In regard to the cost of his process, Keller figures that it requires 2800 kw. hours to make one metric ton of steel of 2204 pounds. Taking the kilowatt year of 8400 hours at 50 francs ($9.70), the electrical energy per ton of steel, including the refunding rate of the plant, amounts to 16.50 francs ($3.21).

With an iron ore with 55 per cent. metallic iron, costing 10 francs ($1.95) per metric ton, a ton of coke costing 40 francs ($7.76) and a ton of lime 15 francs ($2.91), electrodes costing 400 francs ($77.67) and the labor to run the furnace 4 francs (77 cents), he figures that a metric ton of steel at Kerrousse will cost between 90 and 100 francs (or $17.50 to $19.50).

At present the inventor is building a plant for his process in Chile, the occasion of which afforded him an opportunity to report on the state of the electrometallurgy of Troy before the Iron and Steel Institute. Based on his calculation in this report, he states that in some countries, where the economical running of blast furnaces would be out of the question, an electrometallurgical treatment is the only one that can be applied to the manufacture of steel.

Among these countries Chile and Brazil take leading rank; in fact, this applies to all countries where good ores and water power are abundant. In Chile the inventor uses ores from New Zealand of a very pure and rich quality, but containing 9.3 per cent. of titanic acid.

It is of great interest to know that with a special arrangement of his process the inventor was enabled to use the above ores to great advantage in the manufacture of steel and to eliminate in the slag the total amount of titanic acid.

In the treatment of this ore he uses only a small amount of coal of excellent quality in his reducing furnace. The product that he obtains in this manner contains only enough carbon to make it lose its character of pig iron, so that it may rather be considered a very hard steel. The iron obtained from this pure, titaniferous ore is equal in quality to the well known Swedish brands.

E. J. Woodison and L. A. Crandall have severed their connection with the S. Obermayer Company, to embark, together with W. F. Bartlet, in the foundry supply and fire brick business in Detroit, Mich., under the name of the Detroit Foundry Supply Company. Mr. Woodison has been with the S. Obermayer Company for the past six years in charge of their Detroit office and fire brick department, covering territory in Ohio, Indiana and Michigan, and likewise editing the Obermayer *Bulletin*, previous to which time he was with F. B. Stevens for a number of years. Mr. Crandall has been with the same company for the past three years, covering Ohio and Ohio River points, previous to which he was with Byram & Co. for a number of years in the foundry equipment business.

* This corresponds theoretically to 20,000, or with a yield of 20 per cent. in well built turbines, to 16,000 horse-power.

The Visit of the British Engineers.

ST. LOUIS, June 6, 1904.—(*By Telegraph.*)—Our distinguished visitors, the members of the Institution of Mechanical Engineers of Great Britain, who have been in this country principally to attend the joint convention of their institution with the American Society of Mechanical Engineers at Chicago and the World's Fair at St. Louis, have also had the opportunity of seeing many matters of interest to them in other cities under peculiarly favorable circumstances. Their coming having been previously announced, our large commercial organizations and professional societies were prepared to show them exceptional attention.

The first to arrive reached New York in the fore part of May, and in parties of various sizes they continued to arrive up to the time of the convention, May 31 to June 3. After exploring New York and its immediate vicinity, some visited Buffalo, Philadelphia, Pittsburgh, Washington and other cities of the East as they preferred, until their final assembling at Chicago. Including members and ladies, a number somewhat over 90 had registered at the close of the convention. An account of their experiences while in Chicago will be found in the report of the convention printed elsewhere in this issue.

On the Saturday following a large number of the party visited the works of the Allis-Chalmers Company at Milwaukee, and were greatly impressed, as they testify, with the magnitude of both the present plant and its proposed extension. On Sunday nearly all of the English and many of the American engineers were carried by special train to St. Louis. On Monday afternoon, from 4 to 6 o'clock, a reception was tendered them by the commissioner-general for Great Britain and Mrs. Watson at the British royal pavilion to meet the president and members of the Institution of Mechanical Engineers. The regular programme allows the party to remain at the Fair until Thursday night. On Thursday afternoon the Engineers' Club of St. Louis have invited the members of the Institution and the American Society, with their ladies, to a trip on the Mississippi River on one of the river steamers.

From St. Louis the Englishmen will go to Cincinnati, where they will be received by the local members of the American Society of Mechanical Engineers, H. M. Lane, local chairman. Friday morning, June 10, will be spent in visiting various works at the individual's selection, and the afternoon in a trolley excursion through the suburbs to the Country Club, where dinner will be taken. The following morning will be devoted to excursions to other works and more points of interest, and a steamer trip will be taken in the afternoon on the Ohio River.

Beyond Cincinnati there will be no attempt to hold the party together, but it is the intention of many to stop at Cleveland on their way to Canada. The engineers of Montreal, including H. H. Vaughan, superintendent of motive power of the Canadian Pacific Railway, and L. R. Johnson, assistant superintendent, have extended an invitation to a party of the members to visit the large locomotive works of the Canadian Pacific Railway now under construction, and other points of interest.

The departure for home will, in most cases, be taken from Boston, and the members of the American Society in that city have arranged a programme for Monday and Tuesday, June 20 and 21. This will include, outside of social features, on Monday, visits to the Merriman Mills at Lowell, Mass., the Amoskeag Mills at Manchester, N. H., and the water power plant at Concord, N. H., or the B. F. Sturtevant Company, Hyde Park, Mass., and the Brown & Sharpe Mfg. Company, Providence, R. I., and on Tuesday, visits to the Massachusetts Institute of Technology and the Fore River Ship & Engine Company, Quincy, Mass.

It is certain that the Englishmen have shown themselves very appreciative of all that has been done for them, and it is only fair to say that we owe them every bit of it for attentions which in the past they have shown our engineers on their own soil. Were it not so we should be amply repaid by having had the privilege of meeting and becoming acquainted with so delightful and esteemed a body of gentlemen and engineers.

The Stewart Cement Block Machine.

The interest attaching to the use of cement blocks for building purposes may be attributed in a large measure to the increasing cost of lumber and brick and the advancing wages of carpenters, bricklayers and laborers. The success of this type of building now depends upon the ability to manufacture the blocks economically, for this promises the possibility of erecting structures at a cost more nearly commensurate with the income to be derived than pertains under present conditions. A new machine for making the blocks that has the advantage of doing in one operation what requires two or several in former types has been invented by John H. Stewart of Waterloo, Iowa, and is being built by the Stewart Cement Block Machine Company of the same city. This machine is designed to form the hollow cored concrete block which is finding much favor with builders of permanent structures. It forms the block, withdraws the core, drops the end and side plates and elevates the block to a platform with a single manipulation of the operating lever.

Fig. 1 is a view of the machine as it appears after finishing a block. The blocks standing in various positions on either side of the machine show their general form, and their appearance in use may be seen in the

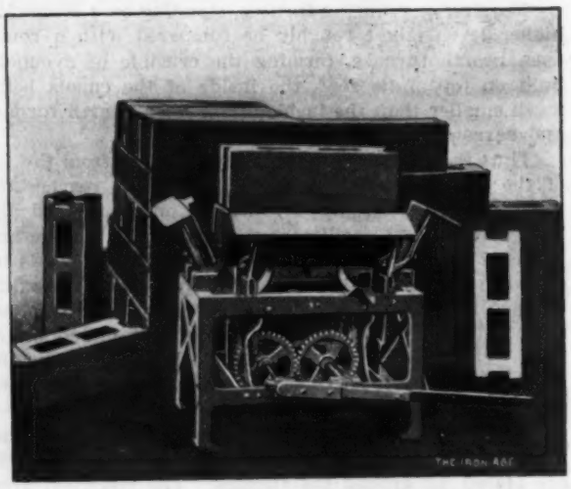


Fig. 1.—The Stewart Cement Block Machine in Use.

partially erected wall in the background. Fig. 2 is a side elevation of the machine, with the side plates removed and parts broken away to better show its construction. Fig. 3 is a plan view of the under side of the machine, as seen from the position indicated by the dotted line X X in Fig. 1, and Fig. 4 is an end elevation with the end plates removed.

The machine consists essentially of two parts—the cast main frame *s* with its gearing and the superimposed mold box. The movable bottom plate *t* has a rectangular opening, through which the reciprocating core *n* passes. During the formation of the block the side and end plates are closed—that is, are in their vertical position—and the bottom plate rests on projections of these plates, making a practically sand tight mold box. After the concrete materials are packed around the sides of the core and the block is completed this bottom plate is moved vertically upward, taking the finished block with it to an unobstructed position on a level with the car or loading platform, permitting the removal of the block easily and with the least liability of injuring it. The mechanism is so timed that the tapering core begins to be withdrawn downward and the end and side plates begin to move away from the block before the upward motion of the bottom plate and finished block begins. The importance of this is obvious, as otherwise the power required to force the block upward from its mold would tend to destroy the block.

All of the movements are accomplished by the depression of one lever through an arc of 45 degrees. This lever, *a*, is keyed to a shaft carrying the spur gear wheel *b*, which meshes with a similar gear, *c*. The gears en-

gage respectively with vertical racks r and s. As the lever is depressed these racks rise vertically, and the toggles f and h, to which the tapered core n is secured through the links i and k, start to draw it downward. The toggles are actuated by links d and e pivoted to crank pins on the gear wheels. At the same time the side and end plates are caused to drop slightly away from the block. The cross rods f and h are both pivoted at g to a cross bar of the main frame. The end plates p and q are pivoted at their lower parts in the frame and have curved arms, p^2 and q^2, extending inwardly and carrying studs, p' and q', which slide in slots o' o' in

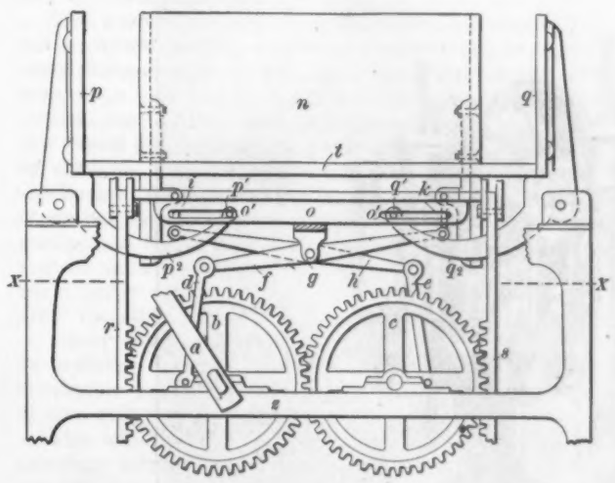


Fig. 2.—Side Elevation with the Side Plates Removed and Parts Broken Away to Show the Mechanical Movements Operating the End Plates.

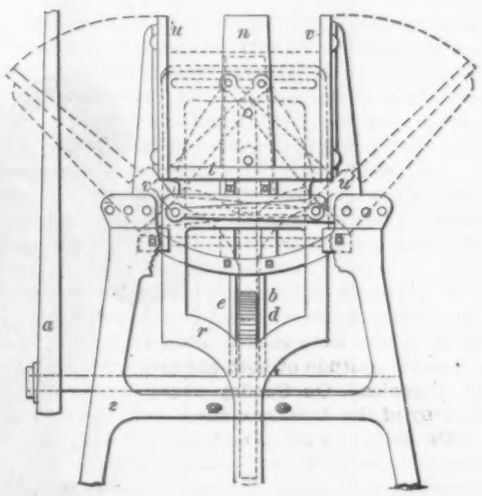


Fig. 4.—End Elevation with the End Plates Removed and Parts Broken Away to Show the Mechanical Movements Operating the Side Plates.

the cross bars connecting the racks r and s. The side plates u and v, Fig. 4, are similarly arranged, with the ends of their curved arms engaging slots in the end cross bars of the racks r and s. As the racks continue to rise with a further depression of the lever their cross bars come in contact with the bottom plate and push the block upward, as before described. A reverse movement of the lever in a like manner lifts the core, raises the end and side plates, and at the proper time locks these parts automatically for the formation of the next block.

It will be seen that the machine has no nuts to screw into place, no corners to turn, no sides to pull away and no hopper, and when the machine is closed the table at

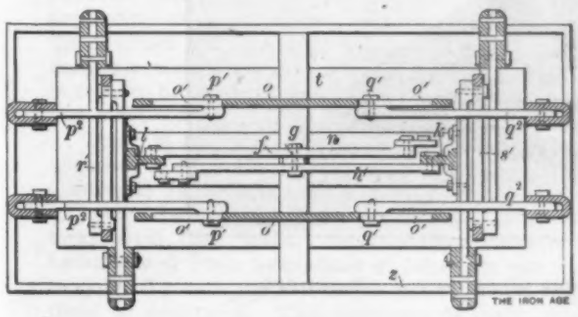


Fig. 3.—Plan View of Under Side of the Machine.

the top of the mold forms a convenient substitute for the hopper.

The machine is adjustable for the making of blocks 24 inches long, 8 inches high and 8, 10 or 12 inches wide, as well as corner blocks for each of the sizes named, and also fractional blocks 4, 8, 12 and 16 inches long for each size. The hight of the block is also adjustable to from 1 to 8 inches. The machine weighs complete 450 pounds and is therefore comparatively portable.

United Sheet & Tin Plate Company Reorganized.

For some time plans have been under way to reorganize the United Sheet & Tin Plate Company, Canton, Ohio, now in the hands of receivers. The company were originally formed by consolidating five sheet and tin plate plants and one coal company in Ohio. The plans to reorganize the company include the adding of two more concerns, one known as the Morgantown Tin Plate Company, Morgantown, W. Va., and the other known as the Atlanta Rolling Mill & Tin Plate Company, Atlanta, Ind. M. F. Straus, president of the United Sheet & Tin Plate Company, announces the reorganization scheme, as follows:

"The company are now being formed to combine the properties of the Morgantown Tin Plate Company, Morgantown, W. Va., having a ten-mill plant, with 5-cent natural gas and 85-cent coal delivered for fuel, and a freight rate of 40 cents per ton less than the Pittsburgh district rate for Eastern shipments, and the Atlanta Rolling Mill & Tin Plate Company, Atlanta, Ind., with a six-mill plant. This plant has an advantage of $1.40 to $1.60 per ton in freight rates to Chicago over the Pittsburgh district. Both of these plants have all steel structural and brick buildings, with the latest machinery and most modern equipment, with an annual tonnage of about 50,000 tons.

"They offer to take in the United Steel & Tin Plate Company upon the following terms and conditions: Providing the stockholders of the United Steel & Tin Plate Company will subscribe, take and pay for 15 per cent. of their present stock holdings in 6 per cent. gold bonds at 85, they will receive stock in the new corporation share for share of the present holdings. All creditors outside of the banks to take bonds for their claims. All holders of bonds of the United Steel & Tin Plate Company to exchange same for an equal amount of bonds in the new company. The new company agree to furnish sufficient capital to finance the company and to complete the steel plant at Byesville.

"The new corporation have arranged for placing about $150,000 of these bonds for immediate use in starting the plants, and will assume all the indebtedness of our company due to banks, providing the stockholders of the United Steel & Tin Plate Company take their share of the bonds above mentioned."

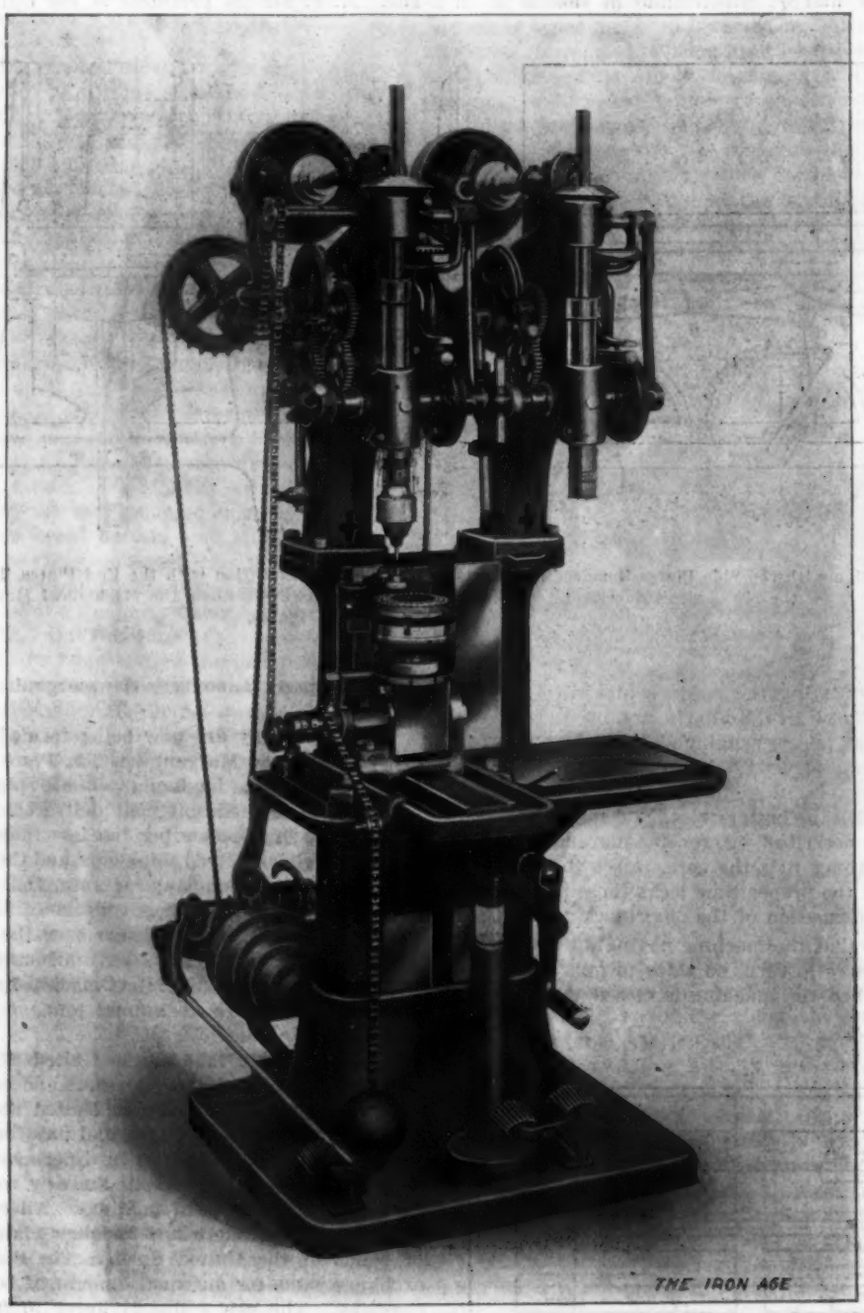
The operating end will be under the supervision of George J. Humbert, formerly president of the Humbert Tin Plate Company, Connellsville, Pa., taken over by the American Tin Plate Company.

The German Engineering Association, in session at Frankfort-on-the-Main, has conferred the Grashof medal on Messrs. Parsons and De Laval, the pioneers in turbine construction.

Barnes Automatic Drill Press with Revolving Chuck.

For attachment to their recent design of machine known as their manufacturers' gang drill, the B. F. Barnes Company of Rockford, Ill., have just perfected an automatic revolving chuck, the application of which constitutes an entirely automatic drilling machine. These machines are built in 14 and 20 inch sizes at present, and are made to have from two to six spindles.

The accompanying illustration shows a 14-inch machine, with the chuck applied to only one spindle. This particular machine is fitted to drill a form of circular cap, as shown in the illustration. The automatic chuck will work in an upright or horizontal position at any angle that may be required. It revolves and spaces automatically for equidistant holes in a circle or for holes of unequal distances, provided no two holes are more than half of a circle apart.



THE BARNES AUTOMATIC DRILL PRESS WITH REVOLVING CHUCK.

The spindles of the machine are independent and self operating, being driven from quarter turn countershafts. A chain running from the lower cone shaft to the upper sprocket wheel operates a spindle by means of a friction against the upper sprocket. On the other end of the friction shaft is a pinion engaging a large gear on the side of the machine. To this gear is attached a vertical bar having adjustable stops, which by means of the toothed segment shown regulate the depth or travel of the spindle. The small spur gears shown simply operate the draw out or automatic stop, and as soon as the feed is thrown out the spindle immediately backs out or returns by means of the toothed segment mentioned above. There is a cam mechanism on the other side of the spindle opposite the large gear mentioned, which throws in the feed at the moment the spindle has descended to the work. In this cam are two stop pins, one of which causes the spindle, when backed or raised up, to stop until the operator trips the same by means of a lever shown in front of the spindle. This is used, however, only when the machine is running semiautomatically. When the machine is operated fully automatically in connection with the automatic revolving chuck this stop pin is removed, so that the spindle, instead of stopping upon the return, will immediately drop down to the work again, drill through or to the required depth at the proper speed and then quickly return, and so keep up this performance continuously.

The chain which operates the automatic chuck is at-

tached to the large gear which operates the spindle, and as this gear revolves, backing up the spindle, the weight of the other end of the chain takes up the slack. When the crank pin of the gear goes down it pulls the chain over the sprocket of the horizontal shaft of the chuck, and by means of a lug on this sprocket the plunger disengages from the notch in the notched or spaced plate. As soon as this is effected the friction at the front end of the horizontal shaft turns the notched plate by means of a pair of miter gears to the next notch, when the plunger again engages the same by a spring mechanism. In this manner the spacing of the work is very quickly accomplished before the spindle again returns preparatory to drilling the next hole.

The notched plate governs the distance between the holes. These notches may be cut equidistant or at unequal distances, as desired, providing that no two are more than half a circle apart. Above this plate, on the vertical shaft of the chuck, is mounted an ordinary three-jaw chuck for holding the work, and it is obvious that by changing the style and size of the same the machine can be used for a wide variety of work. It will be seen, of course, that the limitations of this mechanism are not confined to the drilling of a single piece of work, but that by using a special chuck, or jig, a great many small parts can be set in a circle and drilled automatically one after the other as the chuck or jig revolves.

Reaming or countersinking can also be done as well as ordinary drilling. It will be noted that there is an adjustable guide, which prevents the springing of the drill or tool that may be used.

The spindles can also be equipped with a special auxiliary attachment having two or more small drilling spindles driven from the main spindle. This device can be used to great advantage where it is desired to drill two or more holes simultaneously from the one spindle.

Some idea of the work that can be accomplished by one operator may be formed from the statement of the builders to the effect that on a six-spindle machine one gas stove burner cap, which has six rows of holes, 11 holes in a row, is drilled complete in one minute, one row of the holes being drilled at an angle.

Lake Ore News.

DULUTH, MINN., June 4, 1904.—Members of the Lake Carriers' Association are gradually getting ships under way. About 35 of the larger boats are now moving. These include all the six Tomlinson ships, several of the Provident and Peavey fleets, three of the ten Great Lakes and St. Lawrence ships, and half a dozen boats of the Pittsburgh Steamship Company (United States Steel Corporation). By the middle of the coming week it is expected that many more will be under way, and if the predictions of the members of the association are verified the deadlock will have been broken. Many masters have been extremely anxious to get on their boats, and if there is a sharp break from their ranks they will jump aboard and start.

There is no cause for the fear, expressed in many quarters, that unions along the lakes will assist the masters by refusing to handle cargoes moved down lakes by non-union masters or by masters who have broken away from their union. Organizations affiliated with national and State federations of labor are not entirely in sympathy with the masters in this fight and will give them no assistance. This statement is made officially. They regard the present trouble with extreme indifference. The fact that a victory of one union would redound to the glory of all does not affect them in the least. Not long ago the owners' association met with 22 unions representing lake labor, and came to agreement for this year with all without difficulty. The masters and pilots have never affiliated themselves with labor organizations and did not come into this agreement.

Affiliated union labor holds, as a rule, that the masters' association should not be in a trades union any more than the organization of the vessel owners. The masters are, as the owners assert, representatives of owners on ship, and as such cannot justly belong to affiliated organizations. It looks like a fight to the finish, and if the masters lose, as they are probably bound to do, it is not likely that they will ever again become an organization of importance upon the lakes, or to claim recognition. Too many of their members, taught by the bitter experience of the past few weeks, will utterly refuse to join any organization but one for other purposes. Trades unions represented in mines, on ships and all along the lakes would doubtless like to see the masters win in the present difficulty, but they have far more sympathy for the thousands of union and affiliated workingmen who are now out of work because of this deadlock; and their influence is thrown with the owners in this trouble.

Union tug men will not refuse to tow ships run by non-union captains, union longshoremen will load and unload them, union ore shovelers and trimmers will not inquire as to the papers of the man who treads the upper deck, and union engineers and ship employees will not refuse to answer their signals and obey their commands. This fact is, by the way, of the most vital interest and importance in the present situation.

A second cargo of Mesaba ore, this time a Bessemer, for the Dominion Iron & Steel Company, has left the head of the lakes, and much more is to go this season. Pickands, Mather & Co. have made a large sale to the Sydney company.

Following a reduction of wages from $1.75 to $1.60 a day the stripping crews working for Drake & Stratton Company, at Fayal and Stevenson mines, Mesaba range, have struck. Trouble followed and in the melee that resulted at Fayal four or five men were more or less seriously shot. The Drake & Stratton Company have ordered a suspension of stripping on their contracts for the year, but it is scarcely likely that this order is meant to be taken literally. This company's contracts were secured when the wage scale was higher than $1.75, and if they can force a reduction below that figure they will make an unexpectedly large profit.

Shipments to docks are commencing. They started at Escanaba, but on account of the refusal of the ore handlers there to accept a cut in pay the docks have closed again and the Chicago & Northwestern road has notified mines along its line that it cannot accept consignments. This will probably be fixed up in a short time.

Blue mine at Negaunee, one of the Regent Iron Company's properties, has closed on account of inability to ship ore, and 300 men are thrown out of employment. Curdy mine, Menominee range, a property of the Illinois Steel Company, has closed and the pumps will be pulled.

D. E. W.

An Eastern Export Movement in Iron Ore.

Witherbee, Sherman & Co. of Port Henry, the well-known miners of Lake Champlain iron ore, have resumed the export of ore to Europe. In 1895 considerable quantities of ore were sent to Germany. During the second half of the last month one trial shipment of 500 tons of ore was made to Antwerp, and freight has been engaged for 1500 tons additional to start on June 11. These are trial shipments, and negotiations are on foot for considerable quantities to go both to Antwerp and to Rotterdam.

The ore is that of the Old Bed, No. 21, at Mineville, a magnetite high in metallic iron and in phosphorus. Thus the former shipments made in 1895 showed an average of about 60 per cent. of iron and from 1.6 to 1.7 per cent. of phosphorus. It is the high phosphorus that is more particularly attractive to buyers of the ore on the Continent, since it aids in the production of pig iron suitable for the basic Bessemer process. The ore is paid for on a basis of iron with 60 per cent. minimum, and on the phosphorus contents, guaranteeing 1 per cent. thereof. A premium is paid for excess of phosphorus above 1 per cent., and this contributes toward making the business desirable, since, as already stated, the ore carries as high as 1.6 to 1.7 per cent. of phosphorus.

We understand that the steamship lines have found this ore to be particularly desirable as freight, since it stows exceedingly well along the keel of the vessels. In the absence of other bulky freight the boats take as much as 2000 tons on one trip.

Experiments with a Lathe Tool Dynamometer.*

In the tool steel trials made by the Manchester Committee in 1902-1903 there appeared an entire lack of uniformity in the shapes and angles of the tools submitted by the eight competing firms. There was also no obvious connection between the shapes and angles of the tools and the cutting forces upon these tools deduced in the report from the electrical power measurements made by the committee. Neither did the shape or angle supply a clew to the causes of success and failure in the various trials with different tools.

On the other hand, the necessary reconsideration of the design of lathes for the rapid and heavy cutting rendered possible by the new steels introduced by Taylor and White, and now everywhere adopted, calls for a thorough and systematic investigation of the forces acting upon a cutting tool. If a standard area of cut can be agreed upon for the various sizes of lathe, a knowledge of the forces to be overcome when taking that cut, not only for turning the work against the tool, but also for moving the slide rest and saddle in both the traversing and surfacing directions, will enable the calculations of the stresses in and the proportioning of the various parts of the machine to be gone about in a rational and scientific way.

No such knowledge has hitherto been available, and it appeared to the author that the prosecution of a somewhat extensive research into the matter would well repay the time, labor and expense which it would necessarily involve.

The present paper records the results of over 300 serial trials, each requiring the making, recording and reducing of from 50 to 100 observations; but it is only to be looked upon as a first installment of the work required to be done in order that the action of the tools used in a machine shop may be thoroughly understood.

Two dynamometers were made and used in these experiments; they were each capable of measuring forces up to 15 tons on the tool point when taking a cut. In the first, means were only provided for measuring the vertical force upon the point of the tool, while in the second, not only the vertically directed force, but also that tending to push the tool and saddle backward and that tending to oppose the traversing feed, were observed. The second apparatus grew out of the first, and was only constructed after sufficient experience with the simpler form had indicated the feasibility of a still freer suspension of the tool. The force measurer itself consisted of an hydraulic support and a Bourdon gauge.

The principal hydraulic support, used for measuring the vertical force on the tool in both the first and second dynamometers, is shown in sectional elevation in Fig. 4. The compression piece A, when thrust upward, produces pressure in the fluid, which communicates by means of the small copper pipe B through the make-up plug fitting C with the interior of the gauge tube D. The body of the diaphragm casing E is held down to the lathe saddle by means of two bolts, F F, Fig. 3. Care must be taken in filling the diaphragm to remove all air from the contained fluid. Distilled water, which is boiled after filling the casing, makes a satisfactory medium, and a small filling screw fitted in the end of the gauge tube is necessary for ridding it of air.

Turning now to the other end of the dynamometer, the tool was, in the first instance, free to move only about a horizontal axis (parallel to the lathe center line). This arrangement is shown in Figs. 1, 2 and 3. The axis is formed by the points of two screws, G, passing through two massive cast iron chocks, H, which rest upon the tool slide. The points of the screws enter into deep center pops made on the sides of the tool before hardening. When the tool is resting freely between the two loose chocks, and the screw points are entered into the pops, the tool clamps are tightened down hard upon the former, and when the screws are then advanced up to the tool it has only 1 degree of freedom to move. Friction between the tool and the cast iron side pieces, due to vertical motion of the former, is prevented by interposing greasy plates between them, and the tool is supported near its point by the strut I underneath it. This is of adjustable length, is formed into a knife edge on top and rests upon a knife edge on the cast steel beam J at bottom.

This strut I is kept in place during the cut by the stirrup shaped piece K, which is hinged on the tap bolts L, and retains I by means of two pointed screws, M,

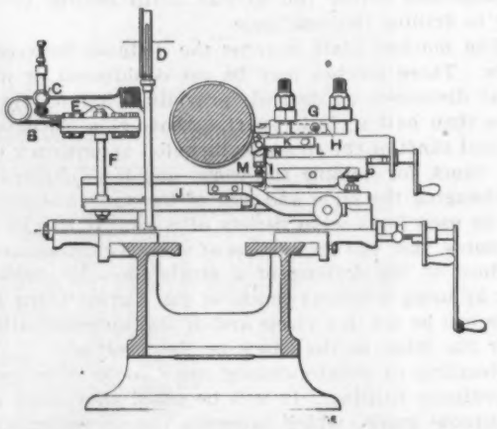


Fig. 1.—Side Elevation of Dynamometer, Measuring Vertical Force Only.

which enter the centers of the tool steel pin N connecting the double and single eye, as shown.

The beam is about 2 feet 4½ inches long, has a fulcrum on the under side and another knife edge formed upon its upper side at the opposite end for taking the diaphragm—strut A. The fulcrum is a knife edge 4 inches long, formed on the beam and resting on a flat steel plate upon the saddle. It is important that the knife edges should be part of the beam, so that the leverage ratio may remain constantly the same, notwithstanding chatter.

With this arrangement loads of over 10 tons on the point of the tool have been taken when cutting, with

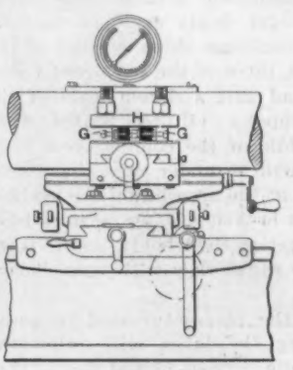


Fig. 2.

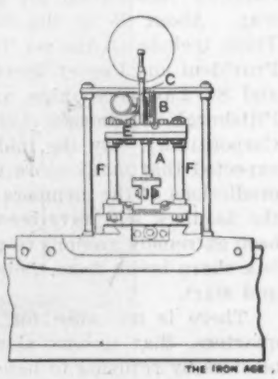


Fig. 3.

Front and Rear Views of Fig. 1.

but little more vibration than what is felt when the tool is bolted to the tool slide in the ordinary way. The diaphragm only yields, when the fluid is air free, by the amount necessary to supply the increased volume of the gauge due to the added pressure, and the spring of the tube is able to bring the arrangement back to zero when the load is removed. In order to assist this action the tool (whose point is set centrally to the work) is adjusted with a considerable droop, so that, as with a spring tool, the cutting force diminishes when the tool deflects.

In the second form of dynamometer the same large hydraulic support Z, Fig. 4, cast steel beam J, struts A and I, are used as in the first for measuring the downward force; but three other diaphragms are added to enable the backward and side thrusts to be measured.

* Abstract of a paper presented by J. T. Nicolson D.Sc., Professor of Mechanical Engineering at the Municipal School of Technology, Manchester; some time professor at McGill University, Montreal, at the Chicago meeting of the American Society of Mechanical Engineers.

The side elevation of the whole instrument is shown in Fig. 4, the plan in Fig. 5 and the front and side views in Figs. 6 and 7. The loose cast iron cheek pieces are here replaced by a casting, O, Fig. 5, shaped to fit round the tool clamp studs, and recessed to provide for the gimbal tool holder P. The object of the latter is to allow the tool freedom to move about either a horizontal axis parallel to the lathe center line or a vertical axis intersecting the other. Two pointed screws, Q, pass through O into center punch marks in the gimbal piece P, and two other similar screws, R, pass through the gimbal into pop marks on the top and bottom surfaces of the tool itself. As the tool point can now move horizontally (as well as vertically), the strut I is pointed at the bottom and rests in a recess in the cast steel beam J, instead of upon a knife edge formed upon it as before. The stirrup piece K is now only used to retain the strut I in the direction of the depth of the cut, that strut being free to tilt somewhat in the direction of the traverse feed. The two hydraulic supports S and T (with struts U and V of adjustable length) are suitably placed so as to retain the tool in a fixed position, in plan, relatively to the tool slide. When an experiment is about to be made, compression is put on both these supports, S and T, by screwing and lengthening struts U and V, so that the tool is firmly held sideways by two compressive forces of from 500 to 1000 pounds each acting upon it from the supports. If, then, the tool slide thrusts to the right when traversing, it will increase the pressure on the right hand support, T, and diminish by the same amount the pressure on the left hand support, S. If it should thrust to the left—*i. e.*, draw into the cut—it will have the reverse effect.

In order to allow of the back thrust of the tool being measured the pointed screws Q are not tapped through the casting O itself, but through sliding blocks, W, fitting in slots therein. An hydraulic support, X, with its strut Y, is supplied at the back of the tool, the strut center line being inclined at the same angle as the tool, which, for the reason above mentioned, droops somewhat toward the work.

The tool projects very little behind the centers of screws Q, and there is thus but little vertical or horizontal motion of the point of strut Y where it touches the tool when the latter moves under the deflections of the diaphragms of supports Z, S or T. Before the cut commences support X is also put under pressure by screwing and lengthening strut Y, so that the tool is kept from running in by being pressed with considerable force through the blocks W against the front of the slats formed in the casting O. Should the tool, when taking its cut, thrust backward with a smaller force than that corresponding to the initial pressure put upon diaphragm X, that pressure must, of course, be suitably diminished by unscrewing and shortening strut Y.

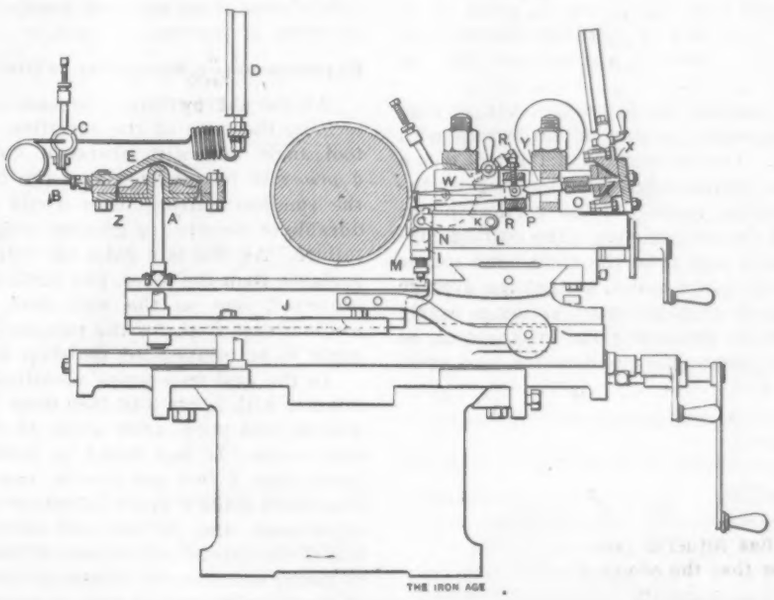


Fig. 4.—Sectional Elevation of Universal Dynamometer.

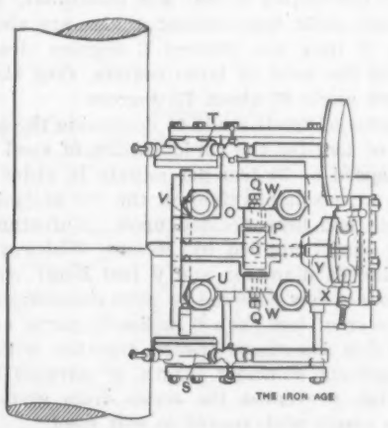


Fig. 5.—Plan of Universal Dynamometer.

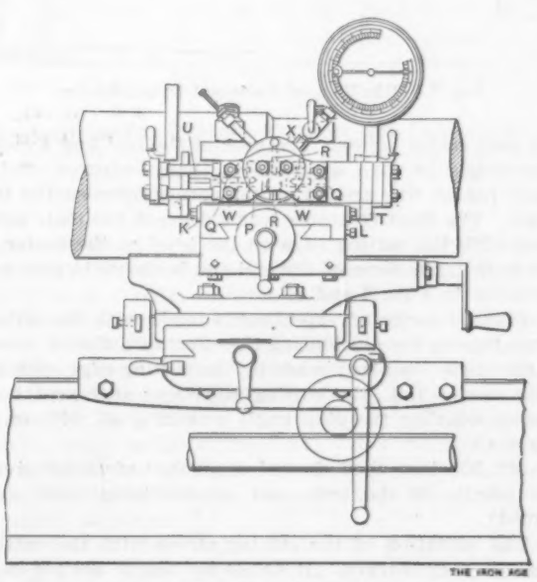


Fig. 6.—Front View of Universal Dynamometer.

Experiments Made with First Dynamometer.

The size of steel ordinarily used in the experiments was 1¼ inches square, although 1½ and 2 inch square steel was sometimes employed. In projecting a series

of trials upon the effect of tool angle upon cutting force the shape of the tool point in plan required first of all to be carefully considered. Almost every variety of shape had been sent in by the steel makers in the committee's experiments, and there was no indication that any one of these was distinctly better than all the others. The round nosed tool was the most common form, and is the easiest to forge and keep; but it has the great disadvantage from the point of view of these experiments that the actual cutting angle varies on a given tool with the depth of the cut.

It was therefore decided to make the cutting edge horizontal and at an angle in plan of 45 degrees with the axis of the work. The top surface of the tool was a plane containing the cutting edge, and inclined at the angle called "the cutting angle" to the vertical plane, which also contained the cutting edge. The cutting edge terminated at a point ⅜ inch from the right hand corner of the tool (in 1¼-inch square tools), so that the average cut taken would give a downward thrust, acting as nearly as could be arranged in the center line of the tool, so as to prevent any twisting action and undue load upon

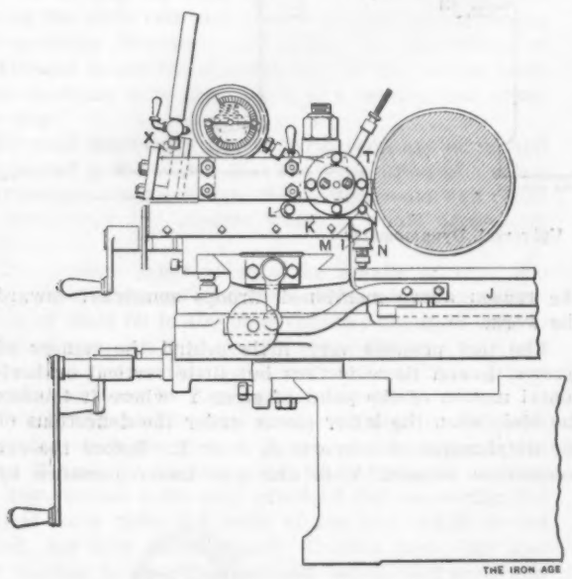


Fig. 7.—Side View of Universal Dynamometer.

the steel center points. The nose of the tool had a clearance angle in plan of not less than 1 degree, and a small radius was ground on the corner between the two edges. The front clearance was 6 degrees, the tools being used with the cutting edge on the level of the center of the work. The form of the tool end is shown in plan and elevation in Figs. 8 and 9.

(In the series of experiments made with the second dynamometer for elucidating the effect of different values of the angle (in plan) made by the cutting edge with the lathe center line, the cutting edge was still kept horizontal, whether the plan angle was 22½, 45, 67½ or 90 degrees.)

Mr. Nicolson then showed a number of tables giving the results of the tests and, summarizing these, continued:

The variation of the cutting stress with the cutting angle is very marked. It varies by nearly 100 per cent. of its smallest value, which takes place, in every case, for a cutting angle of about 60 degrees. As subsequently shown, however, this angle of minimum cutting force is by no means that of greatest durability. A cutting angle of 80 degrees is that indicated as being best for shop use, and the cutting stress for this angle is about 75 tons per square inch.

The variation of the cutting stress with the traverse in the case of soft steel is somewhat complicated. For keen cutting angles (below 75 degrees) fine traverses require less cutting force than wide ones, while for blunt nosed tools—*i. e.*, cutting angles greater than 75 degrees—the reverse is the case, and the fine traverse cut requires the greater effort to remove. At a cutting angle of 75 degrees the stress is the same whether the traverse be 1-16 or ⅛ inch, and has the value of about 100 tons per square inch. It is curious to remark that this angle of 75 degrees is also about the best angle for shop use, as shown by the durability trials subsequently to be cited.

We may, therefore, say, with some confidence, that the ordinary shop tool, when cutting soft steel of this quality, exerts a vertical force of 100 tons per square inch of area of cut removed, irrespective of the proportion of width of traverse to depth of cut.

Experiments on Durability of Different Cutting Angles.

All the above trials were made in the endeavor to determine the laws of the variation of cutting force with tool angle and with shape of cut. It was, however, *à priori* to be expected that the tool angle which gave the smallest cutting force would also prove the most durable or remove the greatest weight of material before failure. As this is a point of even greater practical importance than the other, two further series of trials were projected, one on the soft steel, the other with the medium cast iron, for the purpose of finding the cutting angle to be commended for shop use.

In the cast iron series a cutting speed of 44 feet per minute, with a cut 3-16 inch deep by 1-16 inch traverse, was decided upon, after about 15 preliminary trials had been made. It was found in these preliminary experiments that 1 foot per minute, more or less, in the cutting speed made a great difference in the duration of the experiment, and, as time and material had to be economized, the careful adjustment of the speed was necessary to insure uniform and consistent results. Cutting angles of less than 60 degrees were excluded, but it was decided to use tools of 60, 65, 70, 75, 80, 85 and 90 degrees cutting angles, and to run them at the above speed exactly until they failed.

A cutting angle from 75 to 80 degrees with tools of 45 degrees plan angle were the most durable for medium cast iron. As the cut (3-16 inch) was somewhat shallow, and the tool point had a small radius (about 3-32 inch) in plan, the shaving moved off in a direction nearly perpendicular to the axis of the work, instead of at right angles to the cutting edge of the tool (45 degrees in plan). This means that the actual cutting angle measured in the direction of motion of the shaving (in plan) was about 81 degrees.

Tools should therefore be ground for maximum endurance in the cutting of cast iron in ordinary shop practice, so that their true cutting angles are about 81 degrees; or if they are allowed 6 degrees clearance for working on the level of lathe centers, they should have an included angle of about 75 degrees.

The series of trials made to determine the most durable angle of tool for the rapid cutting of steel had to be run at a speed of 75 feet per minute in order to secure failure in a reasonable time on the cut of ¼ inch by ⅛ inch, which had been decided upon. Unfortunately, the soft steel shaft supplied by Messrs. Whitworth (originally 22 inches diameter and 9 feet long) was, by the time the trials now referred to were commenced, reduced to a diameter of less than 6 inches in parts, and the vibration which sometimes ensued, together with the difficulty of getting sufficient length of parallel bar for a failure trial, prevented the series from giving a quite conclusive result with regard to soft steel.

A further series of trials to determine the most durable cutting angle of tool for steel was carried out with the remainder of the bar of medium fluid pressed steel used in the Manchester Committee's experiments.

The trials above reported with the soft steel bar proved inconclusive in their results, as the bar had become so reduced in diameter that a run of duration sufficient to fail a tool was with difficulty attainable, and excessive springing of the work and chattering of the tool took place. The medium steel bar had, however, still a diameter of 12 or 13 inches, and its length allowed of long runs being taken. Two series were made, one at 74 feet per minute, the other at 73 feet per minute, cutting speeds, the cut in both cases being ¼ inch deep and ⅛ inch wide.

Taken altogether, these trials seem to show that a cutting angle of about 70 degrees (included angle 65 degrees) is that which will last the longest in rapid cutting.

The plan angle of the cutting edge was 45 degrees throughout.

Experiments with Universal Dynamometer.

The results of a series of trials with the second or universal form of dynamometer, in which the thrusts in both horizontal directions, as well as in the vertical direction, were measured, was then indicated so far as carried out up to date, by Mr. Nicolson.

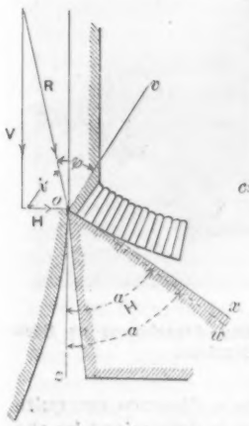


Fig. 8.

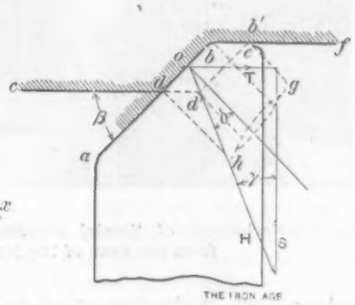


Fig. 9.

One series was projected in which all the tools were to have the same cutting angle—viz., 55 degrees—but four different plan angles of the cutting edge—viz., 22½, 45, 67½ and 90 degrees. In the other series a common plan angle of 45 degrees was to be preserved, with cutting angles of either 45, 60, 75 or 90 degrees.

The observations obtained in these two series of experiments with the second or universal type of dynamometer give the three components of the total thrust of the work on the tool point, viz., the force acting vertically downwards (V), the force acting horizontally, parallel to the axis of the work and tending to thrust the tool to the right, or draw it in to the left (T or — T), and the horizontal force acting perpendicularly to the center line of the work, which tends to thrust the tool backward (S).

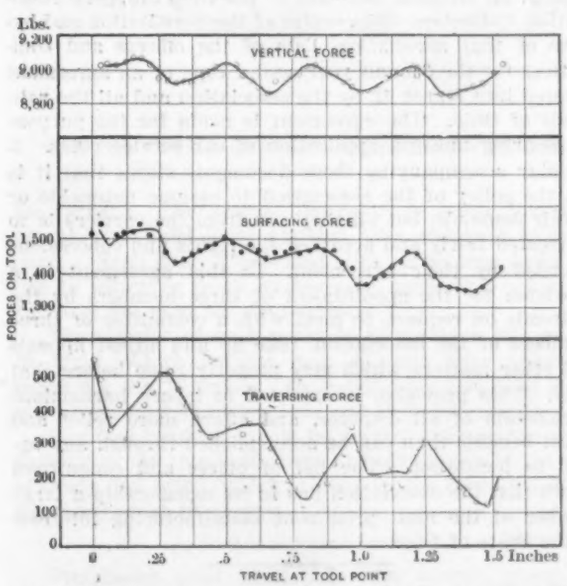


Fig. 10.—Variation of Cutting Forces as Speed Progresses.—Speed, Dead Slow.—Soft Steel Fluid Pressed. ⅜-Inch Cut. ⅛-Inch Traverse.—Tool Angles, 55 Degrees Cutting, 67½ Degrees Plan.

The knowledge of these three components enables the magnitude and direction of resultant force (R) to be determined. Fig. 9 represents the tool and cut in plan, *a b* being the cutting edge, *c d b f* the edge of the work in section, *d b e d' d* the section of the cutting which is in course of removal. The actual point of application of R is, of course, unknown, but will be taken for convenience at a point *o* on the cutting edge midway between *d* and *b*. The lines *d h* and *b g* represent the direction of motion of the removed shaving, which, for deep cuts, was found to be perpendicular to *a b*.

From *o* draw T and S equal to the traversing and surfacing forces (as above described); then the resultant of these two forces (H) (acting at the angle γ to S) is the total horizontal component of resultant R.

Obviously:

$\frac{T}{S} = \tan \gamma$ and $H = S \sqrt{1 + \tan^2 \gamma}$; thus H and γ are known.

If we denote the plan angle of the cutting edge by β, and the angle made by H with the direction of motion of the cutting (*i.e.*, the perpendicular to *ab*) by δ, we have also $\delta = \beta - \gamma$.

Referring now to Fig. 8, which shows a vertical section of tool and work in the plane containing H (and R), the real cutting angle of the tool, called α, is shown dotted by *zaw*, while the angle *zox*, called α_H, is the cutting angle measured in the direction of the force H. Let Ψ be the angle between the force R and *ov* perpendicular to *ox*. Then, drawing V and H as shown, we have:

$\frac{V}{H} = \tan (180 - \overline{\alpha_H + \Psi}) = \tan i$, say, where $i = 180 - (\alpha_H + \Psi)$, is the inclination of R to the horizontal; and $R = H \sqrt{1 + \tan^2 i}$. Also $\tan \alpha_H = \frac{\tan \alpha}{\cos \delta}$; so that α_H and Ψ are known.

The values of these and other quantities, which have been worked out for all the trials made on the Whitworth soft fluid pressed steel with the universal dynamometer, are given in a series of three tables.

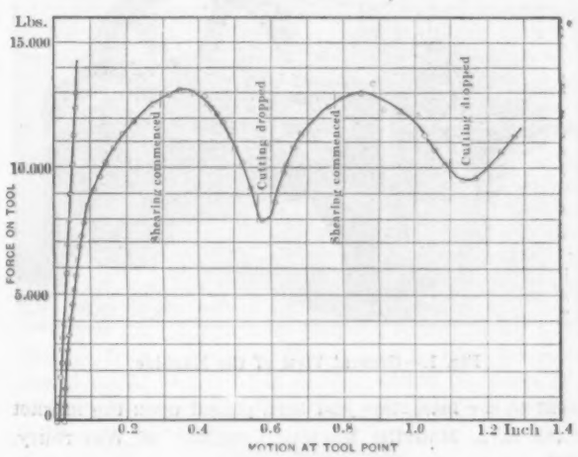


Fig. 11.—Diagram of Cutting Force on Soft Steel.—Expt. No. 636, February 1, 1904. Speed, 1 Foot in 4½ Hours. ⅜-Inch Cut. ¼-Inch Traverse. Tool Angles, 60 Degrees Cutting, 45 Degrees Plan.

The results in these tables show that the traversing force ratio varies but little and irregularly, and is of smaller importance than the surfacing force.

The surfacing force ratio is seen to have its smallest values for tools with a plan angle of 45 degrees (the cutting angle being 55 degrees). This minimum varies from 33 per cent. for light cuts to 18 per cent. for heavy cuts. On the other hand, the percentage sometimes rises to nearly 40 per cent.

Certain of these experiments are of special interest in regard to: First, the variation of the cutting force as the cut progresses at a very low speed; second, the variation of the cutting stresses with large ranges of speed variation.

These experiments were made with a tool having a 55 degrees cutting and a 67½ degrees plan angle, a cut ⅜ inch deep by ⅛ inch wide being taken.

For two of these experiments the lathe was turned round at a cutting speed of about 1 foot in five hours, by means of a wire rope made fast round the large cone pulley, and hauled upon by a man operating a winch.

A pointer about 5 feet long was clamped upon the forging, and the four dynamometer gauges were read at every ½ inch of motion of the end of this pointer, *i.e.*, at about six one-hundredths (0.0625) of an inch of the cut. The vertical force varies from 9080 to 8920 every

⅜ inch of motion of the tool, the same wave length characterizing the variation of the surfacing and traversing forces. The observations have been plotted in Fig. 10 on a base of actual relative tool motion.

A similar experiment, carried out with the first dynamometer, is shown in Fig. 11. Here the cut was heavier, ⅜ inch by ¼ inch, and the tool had a 45 degree plan and 60 degrees cutting angle. The wave length of the force is about 0.6 inch for this experiment, and it varies between 13,000 and 8000 pounds. It will be observed that the force attains a maximum soon after the cutting commences to crack or shear across, and that it drops to a minimum when the small piece of cutting falls off the forging. At such a slow speed as this the cutting has time to shear off right across in separate fragments, whereas it forms a continuous curl of considerable rigidity when the cutting speed is higher than a few feet per minute. These fragments measured in this experiment about ¼ inch across the widest part of their surface next the top of the tool in the direction of motion.

The Manville Bolt Header.

A new bolt header containing an attachment for forming stove bolts or any form of fin head or other bolts where other than the round form of shank is desired, adjacent to the head, has just been placed upon the market by the E. J. Manville Machine Company of Waterbury, Conn.

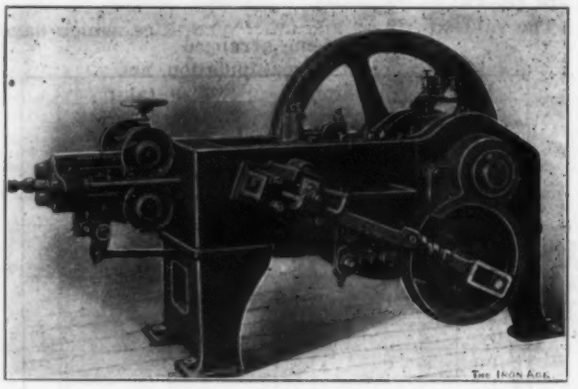


Fig. 1.—General View of the Machine.

Considerable difficulty has heretofore been encountered, due to the fact that such shapes as this machine is capable of making cannot be obtained by a single blow of the header. When it is attempted to create such shapes in a single operation, the invariable result is to bulge the metal at this point.

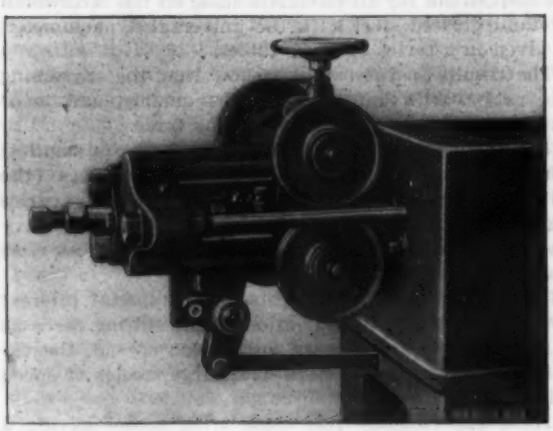


Fig. 2.—Mechanism of Special Heading Attachment as Seen from the Front of the Machine.

The attachment on the new Manville machine, as shown in the accompanying illustrations, provides for two positions of the knockout pin. The gate is so arranged that it carries two punches. The operations are as follows: After the wire is taken into the machine and cut off to the proper size it is carried by means of a finger to a point opposite the center of the heading die. The wire piece is punched into the center of the heading die by a blow of the first punch to a distance not quite the depth of the die. This distance is determined by the setting of the knockout pin immediately after the first blow and before the blow of the second punch has been struck.

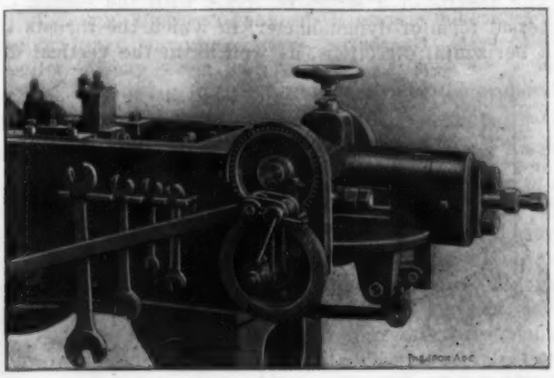


Fig. 3.—Mechanism of Special Heading Attachment as Seen from the Rear of the Machine.

The mechanism that backs up the knockout pin is automatically moved backward, so as to admit of the pin settling back a predetermined distance. When the second blow is struck, therefore, the blank is forced deeper into the die, thus permitting the formation of squares, fins or other shapes on the under side of the head. The machine shown in the illustrations forms 60 bolts ⅜ inch in diameter and 3 inches long per minute. The driving and other mechanism of the machine in general is similar to that of the company's regular line of bolt headers or solid die rivet machines.

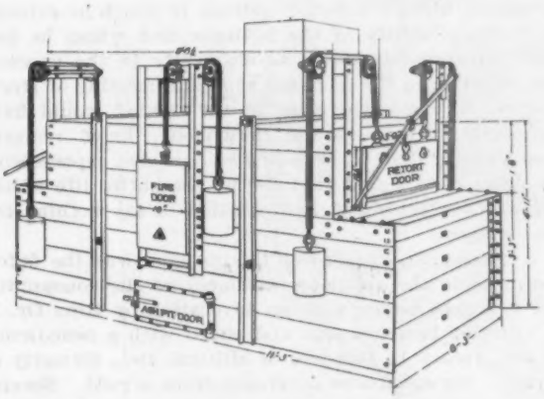
The Ohio Shippers' Association.—We have received from J. M. McCord, secretary of the Ohio Shippers' Association, Columbus, Ohio, copies of the constitution and by-laws of that association, lists of the officers and committees for the current year, and a copy of an agreement entered into March 12 by the association and all the railroads of Ohio. The agreement is made for the purpose of securing uniform application of car service rules. A circular accompanying these documeuts states that it is not the policy of the association to assume untenable or unfair demands, but all they ask from the carriers is to be treated fairly and accorded the rights and concessions afforded by their agreement. In this agreement is a provision for the appointment of three members by the railroads on request, to meet with a committee of three members of the association, take up and adjust appeals and other matters which may properly come before that body. This provision is expected to insure harmonious settlements of all disputes, and afford more relief and direct benefits than can be accomplished through any appeal to legislation. The list of offices and committees shows that the association has in its membership a large number of the most prominent manufacturing interests in the State of Ohio.

The Illinois Steel Company are pushing rapidly the work of building their great cement plant at Buffington, Ind. Electric power will be furnished from the company's works at South Chicago, 6 miles distant, it being generated at a station adjoining their furnace plant, in which surplus blast furnace gas is used as fuel for boilers operating the dynamo engines. In order to take this power across the Calumet River the company are erecting steel towers on either bank, 200 feet high, across which the cable will be stretched at a point sufficiently high to cause no interference with the masts of the tallest vessels. While the expense of building these towers is greater than it would be to pass the cable through a conduit on the bed of the river, the company concluded to use the former method because of the leakage expense that usually attends submerged lines.

The Billings & Spencer Annealing Furnace.

The Billings & Spencer Company, Hartford, Conn., have begun the manufacture for the market of an annealing furnace originally designed for their own drop forging plant. It worked so satisfactorily that it was decided to make it a line of manufacture. It is designed essentially to meet the practical needs of a drop forging plant. The exterior walls are of flat sprocket steel firmly riveted, and girded by uprights of channel iron. The foundations and interior floor are composed of common red brick, Portland cement, lime and sand. The interior side walls are of No. 2 Mohawk fire brick, and the fire boxes and retorts are tiled overhead.

The double furnace, as shown in the accompanying illustration, is fired from one central fire pit, and a single slide damper in conjunction with the blast controls the temperature. In practice it has been found practicable to hold the heat in the furnaces at a very even temperature, so even, in fact, that four or five dies are put into the furnace for heating at the same time, and while the first are being treated after removal from the furnace those remaining in the furnace are retained at the desired heat. The arrangement of the furnace makes easy handling possible, for the door is long, and one piece may be removed without disturbing the others. In the Billings & Spencer works 15 and 16 dies of 0.90 carbon steel, and averaging 7 inches square, are treated in a day, which is a very high production, and this is for a single furnace. The door to the retort is easily raised by means of a hand lever assisted by a weighted sprocket chain. Each door is provided with three peep holes for use in watching work during case hardening, when the furnaces are used for the purpose.



THE BILLINGS & SPENCER ANNEALING FURNACE.

The interior of each retort is 45 x 31½ x 16½ inches in hight, which enables each to hold four annealing boxes 8 x 8 x 17 inches. Or the furnace will take a bar of iron or steel 36 inches long and 12 inches square.

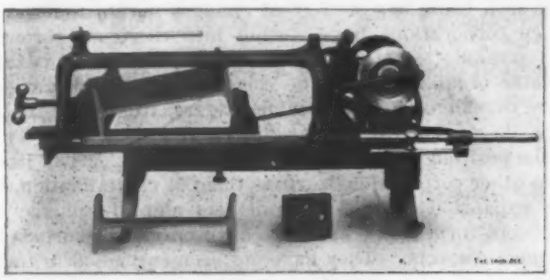
The fuel consumption is no greater than in the usual furnace of the type, and there are advantages in the way of every day firing, which is done in one hour. Fresh firing takes about two hours.

Pittsburgh Coal Statistics.—The annual report of Chief Mine Inspector Roderick on the bituminous district of Pennsylvania gives in detail the coal tonnage of each mine operated, and as classified into what is called the Pittsburgh seam coal, the tonnage is of unusual interest. The Pittsburgh Coal Company tonnage for the year 1903 came from 91 active mines, and the amount was 12,015,071 tons. The Monongahela River Consolidated Coal & Coke Company, with 39 mines in operation, mined at the same time 7,070,153 tons. The New York & Cleveland Gas Coal Company, with seven mines, mined 1,155,248 tons, and the Mansfield Coal & Coke Company 403,496 tons. This makes the total tonnage of the Pittsburgh Coal Company, exclusive of the Midland Coal Company properties, 21,039,968 tons. All other companies in the Pittsburgh district mined at the same time 16,764,224 tons.

The Robertson Power Saw.

What is termed their rapid cut power saw No. 4 has just been placed upon the market by the Robertson Mfg. Company, Buffalo, N. Y. This machine was designed for cutting I-beams, having a capacity up to 15-inch beams. A special feature of construction aside from its large capacity and quick action is its simplicity of design.

As will be noted by reference to the accompanying illustration, the machine is back geared direct to a disk type of crank pin. It is driven by a 14-inch pulley, the gearing being in such proportion that three revolutions of the pulley are required to one stroke of the saw. A frame for cutting 15 inches takes a 20-inch blade. The vise is of new design, being arranged particularly with a view to permitting rapid manipulation, and is graduated in inches. The machine is capable of taking in work 8 inches in hight. Owing to the heavy material on which this machine is calculated to be used, it is furnished with low legs. Another special feature of the machine is the quick acting clutch. The machine is provided with an automatic stop device which stops the motion of the machine as soon as the cut is complete, and hence no countershaft is required. The frame is equipped with an extra weight rod that may be used for changing the weight from its original position. The use of this is recommended only when the saw blade becomes dull and when the saw has made five or six cuts in its original position.



THE ROBERTSON POWER SAW.

While the machine was designed especially for I-beam cutting, it is so equipped that it may be used for cutting any shape of iron or steel coming within the scope of its capacity—namely, 8 x 15 inches. One blade is furnished with each machine.

Sensible Labor Epigrams.

The Chicago *Chronicle* is sending out to manufacturers who will promise to distribute them among their workmen envelopes containing neatly printed cards bearing epigrams on the labor situation. Many manufacturers are availing themselves of this method of talking to their workmen. Following are quotations from some of the cards:

"The same law which gives one man the right to quit work gives another man the right to work."

"To quit work is one thing; to prevent other people form working is another thing. No strike in Chicago contemplates merely the quitting of work. Its real purpose is to prevent anybody else from working."

"No union button gives a man a right to live and to work in peace. While this right is obscured at times, it exists and it is protected not by union buttons as big at butter plates, but by the Constitution and the laws."

"Is that labor free which, on the one hand, must submit to assessments in order to secure work, and which, on the other, refusing to share with idlers its earnings, is hunted with guns and bludgeons like an outlaw?"

"Arbitrate? There is no question for arbitration where there is organized violence and lawlessness. There is no question at all. It is simply the duty of the proper officers to restore order and peace and obedience to law and authority."

"Is it not common sense that under American institutions the majority shall rule, and rule by the orderly machinery of established government? Is it not common sense that trade disputes shall not be suffered to annihilate the peace of an entire community and throttle the law?"

The Thomas Iron Company Fifty Years Old.

The Thomas Iron Company celebrated their attainment of 50 years by appropriate exercises at Hokendauqua, Pa., on June 1. This company occupy a unique position among the iron producing companies of the United States. They are the only iron making company of their age who are conducting business under their original name, without change or reorganization in any way whatever. The company do not occupy relatively as prominent a position as they did 10 or 15 years since. The iron trade has seen great changes within that time. Huge corporations have sprung into existence through the consolidation of separate business establishments into greater organizations. The company who 15 years ago were considered a great business aggregation may, therefore, be a comparatively modest enterprise to-day. This is the position of the Thomas Iron Company. They have seen other corporations surpass them in capitalization, in the expansion of property interests and in tonnage of products turned out, but they have only been surpassed in these respects. They have not been surpassed in their efficiency of management, their power to maintain a high standing in the trade, their sturdiness of purpose to please their customers and their ability to make satisfactory returns to their stockholders. They may be considered, to use a Western phrase, the little giant of the iron trade. They are especially the little giant of the pig iron trade, as from their foundation until the present time they have confined their energies to the production of pig iron alone. From their formation the Thomas Iron Company have steadily pursued the policy of only making pig iron and of holding their trade by the quality of the iron.

The celebration of the passage of 50 years was largely of the character of a family gathering. It was primarily a stockholders' meeting, as all the stockholders of the company had been invited to be present, but invitations were extended to quite a number of persons connected with outside interests. The weather was not propitious for such an occasion, but, notwithstanding a heavy downpour of rain, the attendance was large, running up to more than 400, including many ladies. Among the guests were representatives of other manufacturing interests in the Lehigh Valley, makers of iron in the Schuylkill Valley, and prominent business men from New York and Philadelphia. With wise precaution the company had erected a pavilion not far from their office building, to accommodate the gathering and provide a suitable place for the exercises in case of inclement weather. The visitors who made their appearance during the morning were taken to one of the blast furnaces nearest the office, where they witnessed a cast. This was the extent of the attention given to the company's processes. The weather forbade any extended inspection of the plant as had been contemplated. At 1 o'clock the visitors gathered in the pavilion for luncheon, arrangements for which were exceptionally satisfactory. An orchestra discoursed popular airs during the dinner.

Upon the completion of the *menu*, President B. F. Fackenthal, Jr., announced that, as this was a stockholders' meeting, he would nominate one of the stockholders present to fill the chair and take charge of the proceedings. He proposed Charles F. Chidsey, ex-Mayor of Easton, and his choice was unanimously ratified. Mr. Chidsey, upon accepting the chair, delivered an interesting address which was largely historical. Many of the facts given by him will be found in the historical sketch of the company, from which extracts were published in our last issue. In the course of his remarks Mr. Chidsey referred to the presence of many who had been long connected with the company, among whom was Samuel Thomas, their former president and the only one surviving of the original stockholders. He stated that Mr. Thomas, owing to the condition of his health, had declined to speak, saying that he could not make a speech, but could still make iron. Hearty cheers were given for Mr. Thomas and President Fackenthal.

Captain Fred. R. Drake of Easton was called upon in behalf of the management. Mr. Drake is one of the present Board of Directors and represents the third generation of his family who have served in that capacity. Mr. Drake stated that from the existence of the company the plant had never ceased its operations. This was a record hard to equal. He dwelt at some length upon the splendid financial record made by the company and stated that the directors would do all in their power to maintain the high reputation enjoyed by the company.

Edgar S. Cook, president of the Warwick Iron & Steel Company, Pottstown, Pa., responded on behalf of the company's neighbors. Mr. Cook alluded to the fact that the Warwick Company had been neighbors and competitors of the Thomas Iron Company for 25 years. Their relations, however, had been of an extremely pleasant character, and cordiality was always in evidence.

W. G. Besler, first vice-president of the Central Railroad of New Jersey, spoke for the railroad interests. Mr. Besler expressed the desire of the railroad companies to do everything within their power to promote the welfare of manufacturers along their lines. He stated that the iron business of the Lehigh Valley was so interwoven with transportation that one could not stand without the other.

F. S. Witherbee of New York, vice-president of the Tennessee Coal, Iron & Railroad Company, was called upon and extended his congratulations to the stockholders. Mr. Witherbee paid a well deserved tribute to the management of the Thomas Iron Company, stating that the success of the company was due to the high character of those who had been intrusted with the management.

R. C. Stewart of Easton, a representative of the legal profession, made a polished address, in which he extolled the forensic ability of the business men whom he had heard express themselves so eloquently in the proceedings, alluding to the fact that at such a meeting of stockholders, 50 years ago, most of the talking would have been done by lawyers and clergymen. Brief remarks were made by Geo. W. Cope of *The Iron Age*, representing the press, who stated that during the entire life of the company the press had had occasion to say nothing but good of them.

A noteworthy feature of the occasion was the deference paid to the religious sentiment of the community. The exercises began with an invocation by Rev. Dr. J. A. Little of Hokendauqua and ended with a benediction by Rev. Henry L. Bonstein of Milford, Del., formerly of Easton. No spirituous beverages were served. Several of the speakers referred with strong expressions of approval to the manner in which the management of the company had always given substantial encouragement to churches, schools and general philanthropic movements in every locality in which they conducted mining or manufacturing operations.

As a souvenir each visitor was presented with a bronze pig paper weight, bearing on the pedestal the inscription, "Thomas, 1854-1904."

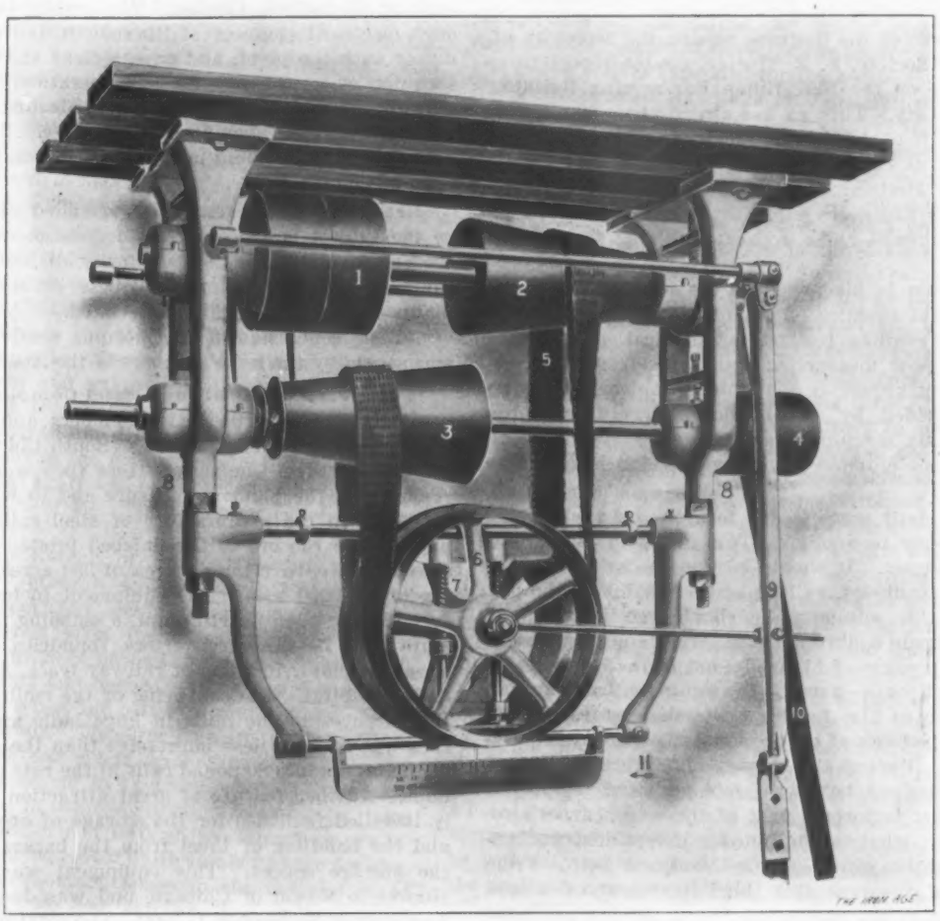
After the speaking the visitors embarked on a train of passenger cars and took a trip over the company's Ironton Railroad. This railroad was purchased by the company in 1882 to secure access to the iron ore deposits along its line. The facilities enjoyed in this respect have been excellent and have been greatly to the advantage of the company, but a much larger benefit has been received from the line than had been anticipated when the purchase was made. This is in the development of the Portland cement industry along the little railroad, following the opening of local deposits of essential raw materials. When the road was purchased the output of Portland cement in the United States was only 85,000 barrels per year. At the present time on this one railroad there are 10 cement mills, producing 5,000,000 barrels per year. The total output for the United States in 1903 was 18,000,000 barrels.

The excursionists were brought back to Hokendauqua at 5 o'clock, and shortly afterward departed for their homes by various transportation routes. Among those present were Wm. H. Hulick of New York, vice-president of the company; W. P. Hardenburgh of New York, member of the Board of Directors; J. Samuel Krause of Bethlehem, member of the Board of Directors; Leonard Peckitt of Catasauqua, president of the Empire Steel & Iron Company; J. M. Fitzgerald of Reading, secretary of the

Empire Steel & Iron Company; Abraham S. Schropp of Bethlehem, secretary of the Bethlehem Steel Company; John M. Hartman of Philadelphia; Walter Wood of R. D. Wood & Co., Philadelphia; Wm. R. Thomas of New York; T. B. Koons, general traffic manager of the Central Railroad of New Jersey; G. M. Harleman, superintendent of the local division of the Lehigh Valley Railroad Company; J. S. Pearson of the Lehigh Coal & Navigation Company; S. H. Chauvenet of the Robesonia Iron Company; W. S. Pilling of Pilling & Crane, Philadelphia.

The White Speed Regulator.

The desirability of providing variable speed drive for various classes of machinery has led to the development of a number of ingenious mechanical devices, one of the latest of which is shown in the accompanying illustration. This is known as the White speed regulator, and is now being exhibited at the St. Louis World's Fair by the builders, the Power & Speed Regulator Mfg. Company, Limited, Kalamazoo, Mich.



THE WHITE SPEED REGULATOR.

The principle of its operation is at once apparent. The constant speed shaft is supported in the upper set of bearings and carries the tight and loose pulleys 1, which are driven by belt from the line shaft or other source of power. The cone 2 mounted on the contant speed shaft is connected with the cone 3 on the variable speed shaft by the flexible leather link belt 5, which passes over the idle pulleys 6. The faces of the latter are beveled at an angle corresponding with that of the cones, so that an even tension is preserved across the width of the belt. A tension is exerted on the idlers by two compression springs, 7, which contribute to the ease of shifting of the idler carriage. At the same time the carriage is adjustable up or down by means of the screws and lock nuts 8, to take up any stretching of the belt which may occur after prolonged running. 9 is the shifter which starts or stops the regulator, and 10 is the shifter which changes its speed by sliding the idler carriage from one side to the other. The indicator 11 is graduated on its upper edge to assist the operator in attaining instantly any exact position of the shifting carriage and the corresponding speed. The lower part of the indicator has a space for the insertion of a card upon which may be recorded revolutions per minute or other values concerned with the operation of machines with which the regulator is applied. This is a matter of calibrating which, once fixed, answers for all subsequent usage.

All cast parts are of iron and the shafts are of steel. The claims of the maker are simplicity in construction, the avoidance of roller bearings or other complicated attachments, simplicity of operation, small amount of friction and lost power and long life. The bearings are of the wick oiling type, designed to run six months without reoiling. The main object is, of course, to allow the running of a machine at its maximum capacity in accordance with the class of work which is being handled. It gives a variation of 2½ to 1, the lowest speed being obtained when the link belt is at the small end of the top or constant speed cone and at the large end of the bottom or variable speed cone, and the highest speed when the belt is at the opposite ends of both cones.

Orders for Steel Cars.—The Pressed Steel Car Company, Pittsburgh, have received a contract from the Harriman lines for 2000 high capacity steel cars. In addition to this order, the company also have an order for 250 convertible side dump steel gondola cars of 100,000 pounds capacity for the Chicago, Lake Shore & Eastern Railway. These cars are of an entirely new type, being particularly adapted for the hauling of coke, coal, ore, &c. They carry coke from the ovens to the lakes or other points of shipment, where they are converted into coal or ore cars for return lading. Another recent order was for 250 all steel 100,000-pound flat bottom gondola cars for the Illinois Central Railroad. Another was for 500 80,000-pound box cars for the Seaboard Air Line. There are other small orders, making in all about 4000 cars that the company now have on their books.

The Mechanical Engineers' Convention.

SECOND SESSION.

Last week announcement was made of the formal opening of the joint convention of the American Society of Mechanical Engineers and the Institution of Mechanical Engineers of Great Britain at Chicago, Tuesday evening, May 31. The second session, held the following morning at the Auditorium Hotel, was devoted to business and the reading and discussing of three papers, as follows: "A Rational Basis for Wages," by Harrington Emerson of New York; "The Burning of Town Refuse," by George Watson of Leeds, England, and "Refuse Destruction by Burning and the Utilization of Heat Generated," by C. Newton Russell of London.

In the course of the business session the secretary of the American Society, F. R. Hutton, read a report from the Committee on the New Union Engineering Building in New York City. This, as has already been explained, is to be the gift of Andrew Carnegie, to provide a home for the national engineering organizations, the American Society of Mechanical Engineers, the American Institute of Mining Engineers and the American Institute of Electrical Engineers, and a separate building for the Engineers' Club.

Mr. Emerson in his paper on the wage question decrys the present practice of paying employees. He considers both prevailing methods as illogical, payment of time being a poor measure of return received, and payment by output unjust, in that too much depends on the facilities provided by the employer, according to the efficiency of his machinery and his shop system. The author proposes a triple wage basis, which he explains as follows:

"A living daily wage is due to every man who signs away his liberty to another. This minimum wage is a matter of contract. It should be due the man, whether he is present or absent, as long as he remains on the pay roll. Above this minimum he should receive when at work at his trade a different and larger sum, equivalent to the current wages of his trade, but in reality made up of two distinct parts—namely, the minimum wage and an increment due to him for his profession or trade. We have in this the basis of the present daily wage system relative to time. Beyond this, however, for future just and peaceable relations between employer and employee, comes the most important part of the wage earner's reward—namely, what is due him for exceptional and unusual co-operation either of mind, body, or both. From the nature of the case this third increment of wages, corresponding to the contingent fee of the lawyer, must be fluctuating, payable some days and others not, because earned some days and others not. In many cases the earning of this professional wage does not imply harder or more exhausting work, but more intelligent and co-operating work. It implies use of heart and head, in addition to use of hands and eyes. As the State fixes the minumum age and the maximum hours at which children may be employed, it might also fix the minimum living wage, below which no one should accept employment, and thus fix a minimum standard. Supply and demand, modified to some extent by the unions, will determine the wage for skill, and that due to intelligent co-operation is a matter to be left wholly to employer and employee."

The paper is largely one of suggestion, that deserves thoughtful consideration, but it offers little in the way of solving the extremely complicated problems which an adoption of its propositions would entail. That is left to the individual employer to work out for his own particular case. The discussion was participated in mostly by the English visitors, who seem to hold that the laboring man is not the downtrodden creature that some believe him to be, and that simpler means of overcoming labor difficulties are possible, where the employer is properly disposed toward his employees and the latter have their superior's interests enough at heart.

The papers on refuse destruction, by Mr. Watson and Mr. Russell, in the absence of the authors, were read by the secretary of the Institution, Edgar Worthington. The first firm dealt with destructors at Brussels, West Hartlepool, Moss Side and Westminster. The nature of the refuse, methods for its collection, its value as fuel, best means for consuming it agreeably and economically, details of typical successful destructors and utilization of the product were the principal points covered. Complete data on tests of two destructors were given in an appendix. The second paper covered nearly the same points, but concerned particularly an account of the destructor plant owned by the Metropolitan Borough of Shoreditch, London. The author, being the borough electrical engineer of Shoreditch, is thoroughly familiar with the plant, and gave a clear and complete description of its construction and operation, the latter especially in connection with the utilizaton of the heat generated by the burning of the refuse. Bothe authors agreed that coal should not be permitted as an accessory combustible.

Lack of time prevented an extended discussion, but as the subject is one of great moment to our larger cities and has not been satisfactoriiy disposed of in this country, the descriptions of these successful English plants will be most highly appreciated.

At the conclusion of the morning session a luncheon was served by the local members of the American Society.

Visit to the Illinois Steel Company.

Wednesday afternoon the members and guests were conveyed by special trains to the South Chicago works of the Illinois Steel Company. Here they were allowed to roam about the plant at pleasure and to witness all the processes in the manufacture of steel rails, billets and plates from the ore to the finished product. The works are extensive, covering an area of 330 acres, and employing about 6200 men. The equipment includes ten blast furnaces, an open hearth plant, a slabbing mill, rail mill, plate mill, Bessemer converters, foundries, repair shops, a cement plant, 70 miles of railway track, 36 locomotives and a hospital. The conveying of the molten metal from the furnaces to the mills in huge ladle and ingot mold cars was scarcely less impressive than the actual rolling of the billets into 80-pound rails at the rate of 450 tons an hour. Another feature of great attraction was the lately installed facilities for the storage of ore and supplies and the handling of them from the barges or vessels to the storage spaces. This equipment was installed by Hoover & Mason of Chicago, and was described in *The Iron Age* of September 1, 1902. The total ore storage capacity is 800,000 tons. The visit concluded, the party was served with a light luncheon and returned by boat along the lake shore, which allowed a splendid view to be obtained of the city and its water front.

THIRD SESSION.

Turbine evening would appropriately distinguish the third session held Wednesday evening in the Music Hall of the Fine Arts Building, adjacent to the Auditorium Hotel, as the five papers presented were in whole or in part devoted to steam turbines. It was decided to first read all of the papers or their abstracts before discussing them.

The first paper, "Some Theoretical and Practical Considerations in Steam Turbine Work," was presented by the author, Francis Hodgkinson of East Pittsburgh. Beginning with the ideal elementary turbine, which was defined as one consisting of a steam nozzle directing a tangential jet of fluid upon a bucket wheel of the Pelton type, the author dealt with the theory of the expansion of steam and the proper form of nozzle and led up to an analysis of the existing types of turbines. These were roughly divided into simple or single wheel and compound classes, the first including the De Laval and the Stumpf, and the second the Curtis, Zoelly, Rateau and Parsons. A brief description and discussion of the merits and disadvantages of each was followed by an elab-

orate exposition of the Parsons turbine. Diagrams and illustrations were freely employed, and in conclusion the economy and general performance of this type was discussed from curves and data covering 124 different tests under various conditions of steam pressure superheat and vacuum.

"The De Laval Steam Turbine" was the subject of the second paper, which was read by the secretary in behalf of the authors, E. S. Lea and E. Meden, both of Trenton, N. J. (An abstract of this paper appeared in *The Iron Age of* May 26.) This paper was frankly a description of the turbine mentioned in its title and drew no comparisons with other types. The fundamental principles of design and operation and working drawings of the most recent forms were given, with a defense of the high velocities which it necessarily employs. Attention was called to the fields to which this turbine is specially applicable—viz., the driving by direct connection of centrifugal pumps and blowers, although electric generating sets may be driven by the use of reduction gearing. The concluding paragraphs referred to curves taken from six tests to show steam consumption per killowatt hour at various loads.

"The Steam Turbine in Modern Engineering" was the title of a paper written by W. R. Emmet of Schenectady, N. Y., but owing to his absence was read, in abstract, by Calvin W. Rice. After a very brief reference to the De Laval and Parsons types as representative of single and multiple stage turbines, the paper launched into a description of the Curtis turbine, particularly dwelling on its advantages due to the placing of the shaft vertically instead of horizontally. Recent improvements in the governing mechanism and valves and the incorporating of the condenser in the hollow supporting base were alluded to and shown in line drawings. An interesting point is the promise that in the future the step bearings at the foot of the vertical shaft will be arranged to be lubricated with water in place of oil. The results of two tests were given.

Prof. Auguste Rateau of Paris, the author of the fourth paper, "Different Applications of Steam Turbines," was present, but lacking confidence in the efficiency of his English asked the secretary of the Institution to read the abstract he had prepared. Similarly to the first paper, this one opened with an explanation of other well-known types, the better to contrast the one invented by the author. The first Rateau turbine was of single wheel type, somewhat resembling the De Laval, but this was abandoned in favor of what is styled the multicellular form in contradistinction to the drum form of the Parsons. Reports of tests on the later type are included. The author has great faith in his turbine for ship propulsion, and gave much space to the description of such installations. He also believes that on account of its efficiency at low pressures it has a future in its ability to utilize the exhaust steam of large noncondensing reciprocating engines when a provision is made for smoothing out the pulsations. (An abstract of this paper was also given in *The Iron Age*, May 26.)

The fifth and last paper, "The Potential Efficiency of Prime Movers," was presented by C. V. Kerr of New York. In it the author sought to establish a standard measure for comparing the efficiency of the various types of prime movers. He developed a formula for each type of motor—water wheels, steam engines and steam turbines—and gave interesting tables comparing the figures obtained for these efficiencies corresponding to various makes and designs.

Discussion.

A written discussion received from Professor Reeve of Worcester, Mass., on the paper presented by Mr. Kerr expressed satisfaction at the attempt to establish a better standard of comparison for steam engine performances. Professor Reeve some years ago made suggestions of a similar sort to the committee then compiling the report of standard engine tests and regretted the apparent lack of a disposition to adopt it at that time. He hopes that the present agitation of the subject may lead to a decisive step in obtaining this needed standard.

In the oral discussions of the papers Prof. Storm Bull of Madison, Wis., deprecated the fact that the titles were all misleading, as they should have consisted of the names of the various turbines with which they were concerned, and objected to the word "impact" where impulse of the steam against the wheels would have been more exact. He also took an exception to the apparent assumption in Mr. Hodgkinson's paper that the expansion of steam is well understood, as he believes there is much yet to be learned about it and that we are no nearer a correct understanding than the European engineers, who he says acknowledge their lack of the true conception of it. Another criticism was the reference to the Pelton wheel as a theoretically ideal turbine.

George I. Rockwood of Worcester, Mass., expressed a wish that the subject of turbines might elicit a spirited discussion, such as used to be called forth by steam engine papers in bygone years. He frankly declared his conversion to the side of the turbine and the conviction that though less economical in the use of steam than the reciprocating engine it nevertheless proves more economical in the dollars expended for the horse-power returned. He took a decided stand against the employment of very high vacuum, 28 inches and above, such as is being sought for in turbine practice, as being too expensive to maintain, and signified a preference for the jet type of condenser rather than the surface type on account of its very low first cost. His experience with steam engines is that the large exhaust pipe is not so essential to low vacuum as turbine manufacturers seem to hold it.

Prof. D. S. Jacobus, Hoboken, N. J., remarked the similarity of results given by tests of the various turbines. In other words, that there was not more difference in the figures obtained from different types than might come within the limits of reasonable error. He believes that many more tests are yet necessary to establish the supremacy of any one type. The report of the Civil Engineers of Great Britain in which they recommend a ratio performance of an engine to the performance of an ideal engine as a standard for comparisons was cited as closely analogous to the standard proposed in Mr. Kerr's paper. Professor Jacobus was one of the committee concerned with the getting up of the report on engine tests referred to by Professor Reeve, and stated that the latter was in error in thinking his suggestion had been ignored, as the ideas presented were incorporated in the report, which also recommended the adoption of the factor arrived at by the Civil Engineers of Great Britain.

Henry L. Doherty, New York, regretted the tendency to change from the old efficiency rating, fearing that it would confine us to the steam turbine or steam engine, whereas what is needed is a rating that will apply to all sorts of prime movers. The internal combustion engine, he believes, would soon be on a basis where, considering the available heat it might use, it would have an efficiency of over 100 per cent.

H. H. Supplee, New York, in connection with the study of the action of steam in expanding, called attention to the excellent work published by Professor Stobola of Zurich, which is probably the best treatise ever written on the subject. Professor Stobola is still conducting experiments on the behavior of steam jets with diverging and converging nozzles, and hopes to add much more to the knowledge of the action of steam under such conditions.

Concerning the friction of steam in turbines, George W. Colles suggested that since work lost in friction manifests itself in heat it might not altogether detract from the general efficiency. He believes that the objection to the friction in the nozzle of the De Laval turbine may be no more deterious than that which exists in other forms where the steam passes over large surfaces of metal after issuing from the nozzles. Concerning the erosion of turbine blades, Mr. Colles believes that it need not of necessity be charged to any other source than the steam itself, as it is not unlikely that steam at high temperature, though a gas, may erode hard metal, as shown in the cutting of valve seats.

Alexander Dow, Detroit, Mich., speaking from the point of view of the buyer of turbines, declared that for his work turbines offer better returns than reciprocating engines. He also deplored the requirement of exceedingly low vacuums. While it is theoretically to be preferred, he believes that commercially it is not so essential, and

that turbine manufacturers are injuring themselves in stipulating too high vacuums. He believes that there will be a market for many types of turbine and that other considerations than theoretical efficiency will determine the extent of their adoption. Reliability he places above all other determining factors. The dry air pump, in his opinion, is installed too often to cover up the laziness of the engineer in preventing leaks, and the ejector condensers used will eventually outnumber those of the surface type on account of their reliability and cheapness. As considerations of most importance he recommends the use of water that is free from intrained air or gas in solution, tight piping and small air pipe clearances. These will secure 26 or 27 inches vacuum, standard good practice, or even 28 inches.

In summing up, Mr. Hodgkinson gave as a reason of selecting the Pelton type as the ideal turbine that it gave most nearly the complete reversal. He agreed that the word "impact" for "impulse" was a misnomer, and that the action of steam in the nozzles is still an abstruse subject.

Speaking on the subject of the De Laval turbine and the question of condensers, Charles B. Rearick, New York, gave the opinion that 26 inches of vacuum was sufficient in most cases, but it is for the engineer to determine. If the cost of fuel is low he can afford to sacrifice in economy, but if fuel is expensive he can well afford to spend more money for his condenser equipment.

Lateness of the hour prevented further oral discussion.

FOURTH SESSION.

Thursday morning the fourth session was opened with the reading of a paper on the "Power Plant of the Tall Office Building," by James Hollis Wells of New York, and one on the same subject by the secretary on behalf of the author, Reginald Pelham Bolton of New York.

The first paper laid stress on the intimate association of the architect and engineer in the designing of modern buildings and spoke of the desirability of such conditions. The points treated of were, in order: The construction of the building proper, including foundations, steel and iron work and brick and stone work—a number of specific buildings in New York City were referred to; elevators, the relative advantages of those of the electric and hydraulic types; the steam plant, boilers, piping, filters, heaters and pumps, with some reference to ventilating; the electric plant and wiring. The paper was profusely illustrated with half-tones of work in connection with the buildings mentioned and also contained working drawings, as examples of foundation work and power plant lay out.

Mr. Bolton's paper was also concerned exclusively with work of this class common to New York City, which, as the author stated, may be considered as legitimately the home of the tall office building, an outcome of the excessive value of real estate. The author discussed the limitations of hight imposed by all considerations (usually not greater than 16 to 20 stories), and mentioned that the Park Row and St. Paul buildings, 27 and 25 stories, respectively, have not justified such extremely high buildings. The subject of elevator equipment is one which received especial attention, and lack of uniformity was cited in the proportioning of the number and travel of elevators to the area, character and hight of buildings. The author then proceeded to enumerate facts which govern the decision of problems of this nature, in the course of which the importance of satisfactory signal systems between floors and cars was mentioned. A preference was shown for hydraulic elevators by virtue of their simplicity, safety, ease of maintenance and control, factors which outweigh the apparent economy of operation of the electric system. The disposition of the cars in a number of specific buildings was taken up at some length, several plans being shown to illustrate. The subject of heating occupied another section of the paper and gave interesting details of the systems which have survived. For instance, the one-pipe gravity system has met with little favor. The two-pipe system, particularly with automatic temperature control, seems to have attained the greatest popularity. The overhead system of supply has not generally been adopted, but very recently seems to be gaining in favor. Various other considerations were then treated, such as plumbing, lighting and mechanical plant in detail.

William H. Bryan, St. Louis, Mo., then presented a discussion on the two foregoing papers, in which he defends the electric elevator on the ground that it allows greatly reduced expense of running, particularly where the load is variable.

A criticism was made by George W. Colles that in discussing the papers both of the authors had confined their remarks to tall office buildings in New York City and that they would not necessarily apply elsewhere, the limits of hight, for instance, depending entirely on the section.

A regret was expressed by George I. Rockwood that neither of the papers had mentioned the direct plunger type of elevator, one which he believes is destined to supersede both the electrical and ordinary hydraulic types. A lack of data on ventilating was also noticed, evidently due to a tendency on the part of the owners to avoid installing such equipments, for the expense of ventilating is about three times that of heating. The speaker recommended subdivided systems with separate fans to supply each floor, rather than one central system to serve the whole building, an arrangement which he claimed to have used with success in hospital buildings.

The electric elevator was again defended by George W. Nistle, Chicago, who believes that designs suitable for requirements of proper space, &c., will soon be forthcoming where the present types fail. As to the number of elevators for a certain building, he proposed a rule which may be very frequently applied. This depends on area, speed of the car and the intervals desired between cars. The formula is $\frac{H}{S} \times \frac{K}{I}$ = area of cars required, where H is the hight, S the speed, K a constant, determined to be about 330, and I the interval between the cars. To get the number of cars, he takes a size between a maximum of 40 and a minimum of 20 square feet per single car and divides it into the required area.

The subject of ventilation was again referred to by H. H. Supplee, who spoke of the lack of proper provisions in most of the tall office buildings. The 12-story Drexel Building in Philadelphia was briefly described, being one in which much attention has been given to ventilation.

S. H. Bunnell, Watertown, N. Y., spoke of the suitability of noncondensing engines where the average load never falls below three-fourths full load. The direction for improvement is in better valve action for the simple engine.

Seepage, Robert L. Gifford, Chicago, explained, had been successfully avoided in his own experience by using two coats of hot asphaltum on the ouside of concrete walls and another coating on the inside, to make an absolutely water proof tank.

The next paper, "Middlesbrough Dock Electric and Hydraulic Power Plant," prepared by Vincent L. Raven, chief assistant mechanical engineer of the Northeastern Railway, England, was read by Secretary Worthington, as was also a written discussion submitted by Mr. Illington. The paper gave a complete description of the equipment of this dock in its present form, operated electrically, and compared by tests the improvement of the electric system over older hydraulic equipments, some of which are still in use. Originally it was provided with steam cranes. Later an extension was made and hydraulic cranes were supplied. When the present extension was proposed it was decided to replace the steam cranes with electric cranes and drive the electric and hydraulic plants from one large power station. Results of tests on the steam and hydraulic engines were printed, and also boiler tests. The workings of the two classes of engines were graphically shown by diagrams. The advantages of the electric system, as given in the summary, are increased facilities of control and reduced time in operation. In the performing of a certain cycle of operations the steam cranes operated 34 times an hour, the hydraulic 36 and the electic 56 times per hour.

In the discussion Mr. Illington criticised the results, in that the hydraulic apparatus, being of some 15 years' earlier make, could not justly be compared with modern electrical machinery. He believes that in the best equip-

ments in the future both systems will be used, but that the hydraulic can be worked faster and safer than the electric.

Other participants in the discussion also took exception to the assumed advantage of electric systems, and believe that both have their use. It was suggested that a smoother, more quiet and less obtrusive working might be obtained with hydraulic cranes. It was also criticised that the question of cost of maintenance had been neglected in the paper. It was conceded that there is a great field for electrical power in dock work, particularly where frost prevails. There was still a lack of conviction that from all considerations there is any gain in economy by electric over hydraulic power.

"The Use of Superheated Steam and of Reheaters in Compound Engines of Large Size"

was the subject of the next paper, by Lionel H. Marks of Cambridge, Mass., and read in abstract by Secretary Worthington. The object of the paper was to collect and present the results of a number of unpublished tests made during the past five years on several high speed two-cylinder compound engines, all made by the same makers and of the same type, differing only in size, cylinder proportions and their working conditions. The performance of the engines was determined under different loads, with and without jacketing and reheating. The engines tested were in electric lighting plants situated in or near Boston. These tests are tabulated, analyzed in detail in the text, and diagrams of the indicator cards plotted profusely. In summing up the general results, the following were the author's conclusions for large size high speed compound four-valve engines of common proportions:

"The jacketing of the high pressure cylinder is of but little value when moderately superheated steam (100 degrees F.) is used. Reheating is probably a source of loss, unless it superheats the receiver steam at least 30 degrees F., and is not fully effective unless it superheats about 100 degrees F. In the latter case it may be expected to effect a saving of 6 to 8 per cent. of the total heat used per indicated horse-power. Jacketing the low pressure cylinder is shown by the steam qualities during expansion in the low pressure cylinder to be unnecessary and therefore undesirable when the reheating is effective. The effect of admitting moderately superheated steam to both the high pressure and low pressure cylinders is to keep the heat consumption per indicated horse-power practically constant throughout a considerable range of loads—from half load to about one-quarter overload. The variation within the ordinary limits of the ratio of stroke to diameter in large size engines of the same power when using moderately superheated steam does not have any marked effect upon the economy of the engine. The size of the engine is an important factor in determining its efficiency."

In discussing the paper, George H. Barrus, Boston, Mass., objected to the fact that tables of the tests were not arranged in accordance with the forms established by the society's Committee on Engine Testing, and also that there were no copies of the original indicator diagrams put in the paper.

C. V. Kerr stated that his investigations on the theory and practice of superheated steam had convinced him that the reheater would again come into favor with the general use of superheated steam. He called attention to the test in the paper which gave the lowest consumption—namely, 11.57 pounds per indicated horse-power—in which there was the highest superheat at the throttle, 60 degrees superheat at the low pressure admission and less than the average vacuum.

George I. Rockwood remarked that better results than any of them were obtained several years ago on an engine of 200 horse-power, which had a high ratio of cylinder volumes. These engines all have small cylinder ratios, and were it not so he affirmed they would have given 10 or 15 per cent. better economy. A test made by Mr. Barrus about a year ago showed a consumption of 11.02 pounds per indicated horse-power, a difference of 17 per cent. in favor of the high ratio compound. The speaker believed that even if a reheater does not increase the economy of the engine, it does increase the power beyond all proportion to its cost.

The last paper, on

"Commercial Gas Engine Tests and Proposed Standard of Comparison,"

was presented by Wm. T. Flint of East Pittsburgh, Pa. It covered the need of accurate and comprehensive testing and the essentials in testing apparatus to obtain such economy. The apparatus was analyzed in detail, and data and calculations of four complete tests were given, plotted to a given basis of 100 horse-power. This basis was obtained from the results of tests on a large number of small engines using natural gas for fuel, which showed that 345 cubic feet of mixture displacement per minute will give in the neighborhood of 100 rated horse-power. This displacement is figured from the area of piston, length of stroke and the greatest number of charges per minute at full load speed, and furnishes the data upon which it is proposed to establish a basis of comparison. It has proved simple of application and satisfactory.

As a supplement to the paper, R. Mathot of Brussels contributed a report which showed remarkable figures of a test upon a modern gas engine. This report was illustrated with blackboard drawings and an extended explanation.

Edward J. Chambers of England added the benefit of his experience with gas engines, the type of prime movers which he regards the superior of all others. In three large works which the speaker has erected in the last ten years he used successively large boilers near the center of the works, with shafting running to all parts; next, in place of extending the shafting he carried the steam to the various consumers, and in the last, after considering both steam and electricity, he resorted to gas and has been thoroughly satisfied with the results. His criticism of the paper was that the author had not carried his investigations far enough. In his own plant he uses the Dowson gas generating apparatus, and started with three small engines, which were twice replaced for larger ones. It is his practice to test his engines by indicator diagrams very frequently, and he offered to furnish the society with more data after he has conducted his tests to the end of attaining more conclusive results. Already he has found that the saving in dollars and cents over steam was double.

THURSDAY AFTERNOON EXCURSIONS.

Thursday afternoon the visitors had an option of inspecting the new Fisk Street Station of the Commonwealth Electric Company, as guests of the Chicago Edison Company, or the stockyards and packing houses, as guests of Swift & Co. Those who selected the former were carried by boat up the Chicago River to the power plant. A large number availed themselves of this, the first opportunity for outsiders to view the new steam turbo-generator plant there installed. The present installation consists of three units of Curtis turbines, direct connected to vertical shaft revolving field General Electric alternators. Each unit has a capacity of 5000 kw., runs at a speed of 500 revolutions per minute, is supplied with steam at an initial pressure of 180 pounds with 150 degrees superheat, exhausts into a vacuum of 28 inches and delivers three-phase 25-cycle alternating current at 9000 volts. The current at the generated pressure is transmitted to substations, where it is transformed to 60-cycle three-phase 2300-1400-volt alternating current and distributed by a four-wire overhead system.

The plant will ultimately be extended to accommodate 14 turbo-generator units of the same size as those now installed. These are the largest turbo-alternators ever built, and are the first of the vertical type to be contracted for in this country. The steam is expanded in two stages, the velocity being partially abstracted by the buckets on the wheel of the first stage and the remainder in those of the second. Steam is admitted at three points, 120 degrees apart, through valves controlled by a governor on the top of the generator connected to the end of the shaft. In exterior dimensions each unit is about 29 feet high and 16½ feet in diameter. They weigh about

205 tons each, the revolving part alone weighing 70 tons. The exciters are 50-kw. 125-volt direct current generators driven by induction motors. Surface condensers of Alberger make are used, each served by a centrifugal pump direct connected to a vertical engine.

The site is a tract of about 24 acres, and the building when completed will be 600 feet long by 230 feet wide. This is divided longitudinally into three parts—the coal receiving room, boiler house and turbine room. The present boiler equipment includes eight double batteries of Babcock & Wilcox water tube boilers, each having 5000 square feet of heating surface and provided with chain grate stokers.

Coal is brought into the receiving house on cars and dumped into a hopper leading to a coal crusher, through which the coal passes to a main conveyor and is delivered into bunkers above the boilers. The bunkers have a capacity of 2000 tons. The ash pits empty into the same conveyor and the ashes are elevated to hoppers in the upper part of the coal receiving house, from which they are elevated into cars. Water for condensing is taken from and returned to the river through concrete tunnels.

Returning again by boat, the party was served with a luncheon. On both trips an excellent opportunity was afforded of contrasting the operation of the old forms of draw bridges and the several new Scherzer rolling lift bridges installed at Van Buren, Randolph and State streets, and the railroad bridge near Twelfth street, having a span of 275 feet.

Thursday evening the members and guests of both societies were tendered a most delightful reception by the local members of the American Society at the Art Institute Building.

CLOSING SESSION.

The last session was held Friday morning in the assembly hall of the Lewis Institute, at West Madison and Robey streets. Six papers were presented, the first being one by William Campbell, late of the Royal School of Mines, London, on "The Effects of Strain and of Annealing in Aluminum, Antimony, Bismuth, Cadmium, Copper, Lead, Silver, Tin and Zinc." Secretary Worthington read the paper, which was a summary of various papers handed in by Sir William Roberts Austin in October, 1901, forming Appendix IV to the sixth report to the Alloys Research Committee. In general, the methods and means of casting the metals were described and the manner of studying their composition and the effect of strain was explained and also the annealing process. The paper was illustrated by numerous half-tones and also by lantern slides. The plates themselves were magnified 30 times and the lantern views again about 60 times, so that an inch represented about two one-thousandths of an inch actual size. The report is divided into separate treatises on the metals which were given in the title, and the paper is concluded with a summary of the effects to be noted when metal cools, the effect of strain and what annealing accomplishes.

The second paper, "Cast Iron, Strength, Composition, Specifications," was read by the author, W. J. Keep, Detroit, Mich. The data given in the paper consisted of 19 series of tests made by the Committee on Tests for the American Society of Mechanical Engineers in 1894 and 1895, and 12 series made in 1899 and 1901 by the Committee on Tests for the American Foundrymen's Association. In ten of these series pairs of test bars were used cast together, varying in size from ½ to 4 inches square and in the latter round bars of the same areas. The transverse strengths and the chemical compositions in the selections of these various bars were shown graphically in 14 charts. Conclusions from the test follow. The author called attention to the fact that strength of any size of test bar could not be determined from any formulæ of a test bar of any size, because the grain changes by slow cooling. Such strength must be obtained by the graphic chart. Three of these are given in the paper, one showing the average tensile strength per square inch, another the average crushing strength for a ½-inch cube, and the third average transverse strength of a section 1 inch square by 12 inches long. Other charts give the tensile and transverse strength and shrinkage for varying compositions of cast iron. A table was also given for obtaining the strength of any size of test bar from the measured strength of a standard test bar, this being calculated from one of the charts, and directions were given for its use. The author then gave proposed specifications for cast iron as recommended by the International Association for Testing Materials at Zurich in 1895, by the American Foundrymen's Association and a number of commercial corporations. The paper was concluded with comments on these specifications and the following summary:

"A variation of size of a casting causes a great variation in strength, because of the change in the rate of cooling. A variation of shape of castings which have the same area of cross section causes a great variation in strength. It is very difficult to calculate the strength of one form or size of test bar from the measured strength of another size. A test bar should be cast horizontally in the ordinary way and in ordinary sand the same as other castings.

"The average strength of at least two test bars cast together should be taken. The distribution of metal in a square test bar gives a stronger casting than in a round bar of the same area of cross section and more nearly represents the ordinary shape of castings. A test bar 1 inch square is the size and shape in general use."

In the discussion on the paper Harrington Emerson entered a warm testimonial to Mr. Keep in the work he has done, and mentioned the benefits he had derived from using the author's tables.

E. J. Chambers of the Institution expressed his preference for rectangular sections in testing bars, this being the English usage, and agreed that the casting of round bars on end introduces conditions that do not exist in the common castings.

"Experiments with a Lathe Tool Dynamometer"

was the subject of the third paper prepared by J. T. Nocolson, professor of Mechanical Engineering at the Municipal School of Technology, Manchester, England. An abstract with illustrations is given in another column. It was read by Daniel Adams of the same city. The paper calls attention to the need of systematic investigation of the forces acting upon a cutting tool since the introduction of steel such as the Taylor-White, and describes two forms of dynamometer which were used in obtaining the results recorded by over 300 serial tests, each requiring the taking of 50 to 100 observations. These tests were commented upon at considerable length and numerous diagrams plotted to show the force on the tool corresponding to the area of the cut for tools ground at several different angles and when cutting medium cast iron and soft steel. Other tests were failure trials with variations of cutting stress, and diagrams were plotted in terms of duration and cutting angles. Some tables at the last of the paper collated extremely useful information with respect to variable plan angles, variable speed and variable cutting angles.

The paper was highly spoken of by all entering into its discussion, who feel the information given is of extremely great value and interest at the present time. President Wicksteed is particularly engaged in tool making, and remarked that he considered it the greatest revelation which ever took place when steels were produced that would roll off cuts in long continuous pieces colored purple with heat while the point of the tool was glowing with a dull red. He stated that the improved dynamometer devised by Dr. Nicholson gives results almost as accurately as a testing machine.

Harrington Emerson told how Taylor and White came to discover their new steel while making a thorough time study of operations, and he believes that the development of the steel will lead to something even more valuable than their power to remove metal rapidly, namely, that it will lead men directing operations to a more thorough study of their entire system. In his own experience he was recently able to reduce the time of a certain operation from 40 to 20 hours by the use of the new steel.

John McGeorge, Cleveland, Ohio, expressed his thanks to the author, as his paper cleared up points on which he has long been seeking information.

Prof. Charles H. Benjamin, Cleveland, Ohio, declared

that he considered this the most valuable series of experiments on the cutting power of tools that has ever been made in the history of engineering, and affirmed his intention of carrying on similar experiments during the coming year at the institution with which he is connected, the Case School of Applied Science of Cleveland, Ohio.

At the Niles Tool Works, Hamilton, Ohio, numerous experiments have recently been made, which were referred to by William Pilton of Hamilton. They found that in cutting cast iron they did not get as good results as with a more uniform grade of steel castings. He believes that by speeding up countershafts will remedy complaints that certain lathes will not perform their work, and advises retaining as far as possible a small diameter ratio of the back gears.

Papers on Locomotives.

The three papers on locomotives followed. The first, by E. A. Hitchcock of Columbus, Ohio, dealt with "Road Tests of Consolidation Freight Locomotives." Following a brief introduction describing the circumstances surrounding the making of the tests, classes of locomotives tested, the preparation for and methods of conducting trials, a great number of indicator cards are shown and complete records given of the tests. Graphically logs of the tests were also given. Among other conclusions it was stated that the greatest loss as shown by the several heat balances is that due to combustible matter passing out of the stack.

A paper presented by Prof. W. F. M. Goss of Purdue University on "Locomotive Testing Plants" was an exceedingly comprehensive one, beginning with the experiments of Alexander Borodin, engineer in chief of the Russian Southwestern Railway, in 1881 and 1882. This was an exceedingly crude plant in which the power of the locomotive was absorbed in the driving of the shafting and machinery. The first plant at Purdue University, installed in 1890, was described and illustrated at considerable length, and also the second and present Purdue plant, which was put in place following the destruction of the first by fire in 1894. The new plant has many important changes, chief of which is that it will accommodate any locomotive of which the driving wheel base does not exceed 18½ feet. The layout of the plant and the details of the dynamometer, brakes and other apparatus are fully explained. The paper also describes experiments conducted by Robert Quayle at Kaukauna in 1893, under the direction of the American Railway Master Mechanics' Association. Mr. Quayle was also responsible for the plant of the Chicago & Northwestern Railway Company erected in 1895 at Chicago. Description and illustrations of this plant were given. The locomotive testing plant at Columbia University, New York, installed in 1899, was another which received an illustrated description. Prof. F. R. Hutton, the society's secretary, was intimately associated with negotiations leading up to the gift of the Baldwin locomotive to Columbia. The last plant described is that of the Pennsylvania Railroad system at the World's Fair in St. Louis, which is at present in operation, and from which valuable records of tests are anticipated, these to be made public later on in the year. The American Society of Mechanical Engineers and the American Master Mechanics' Association have both been called into advisement by the Pennsylvania Company in connection with these tests, and have appointed committees who will give a large part of their attention to the tests.

The last paper on locomotives was entitled "Testing Locomotives in England" and was a compilation of answers received from communications addressed to various of the English railways inquiring as to their methods of making locomotive tests. These were the testing plant of the Great Western Railway, submitted by G. J. Churchward of Swinden; measured tests, instruments and results required, submitted by W. F. Pettigrew, locomotive superintendent of the Furness Railway, and other methods of testing described by John F. Mackintosh of the Caledonia Railway, Sir Douglass Fox and T. Harry Richy of the Paff Vale Railway.

Secretary Worthington spoke of the gratitude which locomotive engineers in Europe generally feel toward Professor Goss for what he has done in the matter of locomotive testing at Purdue University, and conveyed regrets of several locomotive superintendents in England that they could not attend this convention.

Director Carmen of the Lewis Institute then introduced Judge Kohlsaat, the president of the Board of Trustees of the Lewis Institute, who gave an address of welcome to the American Society and the Institute. His remarks bore on the good he hopes to see achieved by their institution in coming years, and hoped that it might produce many men of the character of those whom he was addressing. In concluding, he asked the criticism and encouragement of the members of the two societies, and expressed the wish that their meeting there might in some way foster the building up and strengthening of their institution.

R. W. Hunt announced the death of a distinguished member of the American Society, David R. Fraser, which was received with an expression of sorrow on the part of President Swasey.

President Swasey, speaking for the members of the American Society of Mechanical Engineers, expressed their pleasure in the fortunate outcome of the plans which had brought about the Institution of Mechanical Engineers as guests and co-workers to this convention. Professor Wicksteed replied for the institution, and voiced their appreciation for the kindness and courtesy with which they had been received. He stated that this had been the largest meeting of mechanical engineers ever assembled, 933 being the total number of individuals finally registered, including members and guests of both organizations. (Between 90 and 100 of these were visitors from abroad.) He then offered the following resolution, which was unanimously adopted:

The Institution of Mechanical Engineers desires to take this occasion to convey to the American Society of Mechanical Engineers its warm thanks for all that has been done for the pleasure and profit of its members. It desires especially to thank the Council and executive officers of the American Society for courtesies, official and personal, and for the arrangements which have been made for it to study American industry in its home field. The Institution further desires to record the pleasure its members have received from the opportunities extended to them during their stay in Chicago and in their joint participation in the Chicago meeting. The visitors ask that in the resolutions of thanks for specific things, which are about to be presented to this joint meeting, they may be particularly included, and that they, as well as the members of the American Society, may be identified with them.

Secretary Hutton presented resolutions, expressing the thanks of the convention to the city of Chicago and to the various corporations which had extended the privileges of visiting their works, and to the trustees of the Art Institute and the Lewis Institute for the reception and courtesies extended to them.

The convention adjourned *sine die*.

As the guests of the Lewis Institute the members were invited to the dining rooms at the top of the building, where they were served with luncheon.

Visit to the International Harvester Company's McCormick Works.

Following the luncheon at the Lewis Institute, one party of the members and guests were conveyed by cable and steam cars to the works of the International Harvester Company. The visitors passed through the streets of a hard wood lumber yard belonging to the McCormick plant, in which 50,000,000 feet of hard wood lumber were stored, claimed to be the largest hard wood lumber yard in the world; thence through the wood department of the company, where an elaborate system of exhaust for shavings and dust is in use, each separate machine working in a hood from which the shavings are sucked up through inclined pipes to a main above, from which they are passed through cyclones or separators and into the boiler room. The new malleable iron foundry attracted keen attention, as apparatus and methods are in vogue there that are new to the craft. The annealing ovens are fed with coal dust fuel by apparatus of the Sturtevant type. The tops of the ovens are removed by an overhead electric crane to permit the loading and unloading of the annealing pots. After annealing the pots are lifted out by the crane, and their contents dumped into a device which separates the packing from the castings. In this building several hundred Pridmore molding machines are

in use. On entering the core room, the visitors were surprised to see 100 girls at the core benches instead of men and boys. John G. Wood, the general superintendent of the plant, stated that the girls were able to make better wages there than in almost any other class of skilled labor, and that the company were well pleased with the change. The room is ventilated by air blast, which keeps the air pure and overcomes the unpleasant effect of radiation of heat from the ovens. In this connection, F. A. Flather, the general manager of plants, for the International Harvester Company, who piloted the party, explained that every known means for insuring the health and comfort of the employee was used in the plant, including a constant supply of pure drinking water from an 8-inch artesian well over 1500 feet deep. Thoroughly modern systems of sanitation, heating and ventilation also contributed to the welfare of the operatives. Attention was also called to a new eight-story warehouse, 500 feet long and 80 feet wide, with 20-foot loading platforms running the entire length at either side. The building is of fire proof construction, steel and brick, and the platforms are roofed with wire glass.

The whole plant covers 170 acres of land, of which 80 acres are under roof, gives employment to 9300 hands during the busy season, and has a capacity for turning out on an average of one finished machine every 24 seconds.

Other Excursions.

From the McCormick works the visitors who had taken in the stock yards tour the day previous, and consequently had not yet seen the Fisk street power station of the Commonwealth Electric Company, were conveyed thither down the Chicago River on the steamship "Indianapolis."

Guests who had seen the Fisk Street Power Station the day previous continued on their journey on the Santa Fé train through the clearing yards of the Union Transfer Company, then back to the main line of the road at McCook, thence southward to Romeo, where they disembarked and were transferred to boats on the drainage canal. The greater length of the canal proper was thus inspected, including the controlling works at Lockport at the southwestern terminus of the canal. Isham Randolph, chief engineer of the Sanitary District, explained to his guests the method of excavating the canal, the engineering difficulties that were encountered and showed the operation of the controlling works by having the dam raised and lowered.

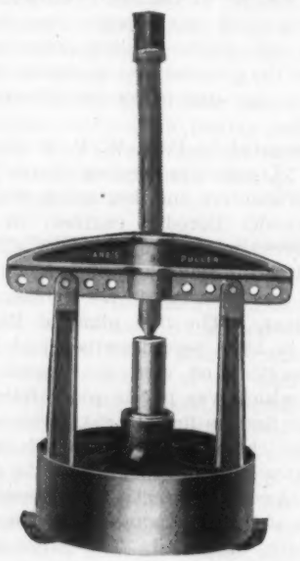
This excursion was given jointly under the auspices of the Sanitary District, the Union Transfer Company and the Western Society of Mechanical Engineers.

The delightful programme of the week was finally concluded Friday evening with a special concert by the Thomas Orchestra, given in the Auditorium Theatre to the members of the American Society of Mechanical Engineers, the Institution of Mechanical Engineers and their ladies and guests by the local members of the American Society. The concluding number of the concert was the rendering of the national hymns of the two countries, "My Country, 'Tis of Thee" and "God Save the King." These, as is well known, are set to the same air. The audience arose and joined in singing two verses of each hymn, and the effect was an impressive one, which will long be remembered by those who had the pleasure of participating. It may well be taken as a significant indication of the good feeling which exists between the two countries and a happy omen of the advancement in engineering knowledge which is certain to accrue from the sympathetic co-operation of these two national associations of mechanical engineers.

Justice Windes of the Appellate Court has ruled that the city of Chicago is not permitted to alter plans and specifications for public works after sealed bids have been received according to plans previously adopted. This decision overruled Judge Brown's ruling, in which he refused to grant an injunction asked for by John Mohr & Sons, bidders on the boiler plant of the Fourteenth street station, enjoining the city from completing the contract with S. Freeman & Sons Mfg. Company, Racine, Wis.. Judge Windes ruled that permission to change a bid is a clear violation of the purpose, intent and spirit of the law, and opens the door for preferences and favoritism as between bidders; that when a bid is changed it is no longer a sealed bid, submitted in the first place. The contract was awarded to the Freeman Company several months ago at about $95,000, they being the lowest bidders, but after the bidding they were permitted by the city engineer's office to make changes in the plan for feed water purifiers, and it was against this feature that the injunction was prayed for.

The Crane Puller.

Crane & Richardson of 112 Water street, Boston, are manufacturing a new puller for machine shop use, as shown in the accompanying illustration. The beam is provided with holes to take pins holding the arms in various desired positions. The puller is the reverse of an arbor press, yet it may be used also as an arbor press, as shown in the illustration, where the turning of the thread is forcing the plug into the hole in the cam. In reversed position of the cam the force would be exerted as a puller. One usefulness of the tool is in loosening pulleys on shafting, which is oftentimes impossible by ordinary methods, excepting when attended by serious injury to the pulley. Once loosened by the puller, it is an easy matter to drive the pulley off the shaft. The puller is furnished in two sizes, one with beam 14 inches long, arms 10 inches from bottom of beam to top of hook, and the nut 3 inches long. The other size has a 10-inch beam, arms 6 or 9 inches, and is made especially to be a part of an automobile kit of tools for repair uses. The puller may be used as a jack in emergencies.



THE CRANE PULLER.

The Standard Scale & Supply Company.

The limited partnership of the Standard Scale & Supply Company, Limited, Pittsburgh, with a capital of $75,000, has been succeeded by a corporation known as the Standard Scale & Supply Company, with an authorized capital of $600,000, of which $450,000 has been issued. This concern have just finished the building of a large new scale factory at Beaver Falls, Pa., their old plant at Bellefonte, Pa., having been abandoned. Their new factory embodies the results of a dozen years of experience in the manufacture of high grade scales, is electrically equipped throughout and is a most modern factory in every way. This new plant has been necessitated by the steady growth of the business of the company, the Standard scales having become widely and favorably known.

The fire loss of the United States and Canada for the month of May, according to the records of the New York *Journal of Commerce*, shows a total of $15,221,400, and the aggregate for the first five months of the year amounts to $161,887,750, as compared with $69,670,000 for the corresponding period of last year, and $76,860,500 for the first five months of 1902.

The Burgers System of Blast Furnace Construction.

As most of our readers are aware, blast furnaces in Germany are usually built without any shell of plate work, such as is now practically universal in this country. The top rigging is supported by a framework of structural material, entirely independent of the masonry, which is held in place laterally by a succession of steel bands, while vertically it is free to expand or contract with variations of temperature. Whether exposed or contained in a shell of plates, the brickwork is rapidly attacked by the mechanical and chemical action of the contents of the furnace, and in consequence rapidly undergoes a change of shape. This leads to irregularity of working and increased consumption of coke. It is in order to counteract this tendency by cooling the masonry that German furnaces are built as stated above, while in America extensive use is made of cooling plates.

A leader in the attempt to prolong the life of furnace linings is Mr. Burgers of Gelsenkirchen, whose efforts have taken the direction of decreasing the thickness of the brickwork, especially in the upper part of the bosh, binding it together with metal as strongly as possible, and at the same time making extensive use of water cooling. He first designed and put into use a peculiar form of mantle plate, built up of eight segments bolted together, the joints resting on the columns. For further security this plate is surrounded by two iron or steel bands. Its inner wall is sprayed on the outside with a moderate amount of water, which, collecting in the lower part, is from there piped away as most convenient. This water cooled mantle plate, shown in Fig. 1, has been in use in several furnaces for some years. On the inside it is protected between the ribs by little more than 2 inches of firebrick.

The next step was to build the whole stack of cast iron plates of similar construction. These plates, the details of which are shown in Fig. 2, rest on the mantle plate, each section being 1½ meters (58 inches) high and consisting of segments 1½ to 2 meters (58 to 78 inches) in width. The segments are firmly bolted together, and each is surrounded by two heavy bands. All joints are machined and packed with asbestos, and a rust joint is also formed, in order to insure absolute tightness. Each segment is sprayed individually, or a waste water trough may be provided for every three rings. The troughs are connected by pipes so that the waste water can be carried away at a few points only. Internally, the segments are covered with firebrick, the bosh and hearth being built of carbon blocks.

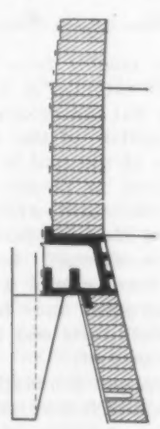


Fig. 1.

The amount of cooling water required is not large enough to jeopardize the success of the system. It amounts to about 15 gallons per minute for every 100 square feet of the shell, the increase in temperature of the water amounting to about 36 degrees Fahrenheit.

The upper part of the furnace is built of brickwork in the usual manner, as water cooling would cause practical difficulties, owing to the liability of interruption to the supply, and also because the wear on this part of the furnace is insignificant as compared with that lower down.

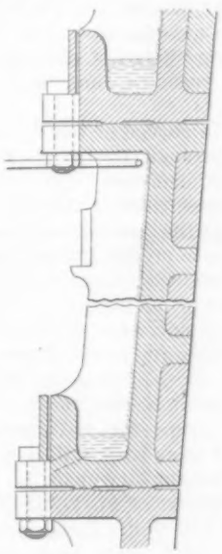


Fig. 2.

The weight of the various parts and the amount of cooling water required are shown in the following table, the figures for the first two furnaces apparently being calculated, while those for the Vulcan furnace are doubtless taken from actual practice:

	Cast iron furnace.				Brick furnace.	"Vulcan" Furnace at Duisburg.		
Capacity	28,251 cubic feet				28,251 cubic feet	10,594 cubic feet.		
Weight of stack.. Iron.. Castings.	420 T.	7 T. Bolts.	18 T. Bands.	10 T. Plates.	70 T. Plates.	160 T. Castings.	2 T. Bolts.	10 T. Bands.
Weight of stack.. Brick	130 tons				1,500 T.	100 tons.		
Weight of stack.. Totals	590 tons				1,570 T.	270 tons.		
Weight per foot of stack	25 tons				67 T.	19 tons.		
Cooling surface	4,950 square feet.				150 cooling plates.	1,635 square feet.		
Cooling water per minute (without tuyeres)	0.16 gallons per square foot = 792 gallons.				10.5 gallons per plate = 1,575 gallons.	0.15 gallons per square foot = 245 gallons.		

Figures for the furnaces more recently constructed on the Burgers system are given below:

	Mantle plate, measured along the periphery at a. tons per foot run.	Mantle, measured at b (on the inside) tons per square foot.	Bolts. Pounds per square foot.	Bands. Pounds per square foot.	Thickness of shell. Inches.	Thickness of brick work. Inches.
Furnaces I and V at Gelsenkirchen	0.609	0.304	5	20	2.7	2.7
Furnace at Bruckhausen	0.685	0.380	8	20	3.1	4.7

The Vulcan furnace at Duisburg, of this construction, has been working for the last five years, giving perfect satisfaction. At the large works in Bruckhausen the furnace of this type has been running since the middle of February, making 500 tons of basic Bessemer pig iron daily, and giving no trouble. The consumption of coke is the same as in the brick furnace—namely, 20 cwts. per ton of iron. A 250-ton Burgers furnace is also being built at Schalke.

The Illinois Steel Company, Chicago, emphatically deny any insinuation that their plate mill has closed down as the result of an accident or for any other reason. They also say that while there have been some few accidents in that mill, as well as in others, leading to the temporary cessation of work, the rail mill is in full operation and sufficient business is in hand to continue it in that shape the balance of the year.

The Philadelphia Foundrymen's Association.

The one hundred and thirty-eighth regular meeting of the Philadelphia Foundrymen's Association was held Wednesday evening, June 1, at the Manufacturers' Club in that city. Alexander E. Outerbridge, Jr., occupied the chair in the absence of the president.

The Delaware River Steel Casting Company, Chester, Pa., represented by G. Weaver Loper, was elected to membership in the association.

The committee in charge of the "vaudeville dinner" held last month reported, and was discharged with thanks.

The committee in charge of the World's Fair foundry exhibit reported through Dr. E. E. Brown, a member of the Executive Committee, who had recent advices from Dr. J. A. Holmes, chief of the Department of Mines and Metallurgy, that the foundry building proper is being erected at the expense of the Exposition management at a cost of about $6500. No charge will be made for space, but it will be alloted to the parties making application for for same. The foundrymen's headquarters, a building 32 x 100 feet, adjoining the foundry, is being erected, and besides containing offices of those in charge of the foundry work will contain rooms for pattern storage, &c. General reception rooms for visiting foundrymen and others interested in their work will also be provided.

A portion of the foundry will be operated partly through the co-operation of St. Louis foundrymen, using their own molders and helpers and making castings for the trade. Small light high grade castings in brass, bronze and iron will also be made, the expense of the work being met by the sale of these articles on the Exposition grounds. The money originally subscribed by the various manufacturers to insure the exhibit is to be used in erecting and equipping the foundrymen's headquarters above mentioned. The Exposition management is, therefore, asking the contributors, both voluntary and for space, to remit their subscriptions to F. C. Schwedtman, Chemical Building, St. Louis, Mo., who is president of the St. Louis Foundrymen's Association and acting as treasurer of the Foundry Exhibit Committee. All funds received will be accounted for and a list of same duly enrolled and published. With the co-operation they are receiving, Dr. Holmes advises us, the success of the foundry exhibit is assured, and will be a credit to the foundry industry and to all who have assisted in the undertaking.

The paper of the evening, entitled "Application of the electric furnace to the treatment of iron, either iron ore, cast iron, mixed scrap, &c., also the refining of iron into steel and the production of special grades of steel," was by P. McN. Bennie of Fitzgerald & Bennie, Niagara Falls, N. Y., by whom it was also read. The paper was fully illustrated by lantern slides showing the different styles of furnaces, and at the conclusion Mr. Bennie was tendered a vote of thanks for his excellent paper.

After adjournment, which was taken until September 7, the next regular meeting, luncheon was served on the roof garden of the club.

The Ball Engine Company's New Engine Shop.

The Ball Engine Company of Erie, Pa., have for some time been hampered by lack of space, and as their old location did not permit of adequate extension they have started to build a new plant upon a larger piece of ground. They have now completed and in operation the engine shop as shown in Figs. 1, 2 and 3. The building in its constructional details was designed by F. Felkel of Pittsburgh. It is arranged in all features with a view to future extension as needed. The saw tooth roof adopted for the wings has been modified from the usual practice principally to prevent trouble from snow and ice. As is shown in the side elevation, Fig. 1, the saw teeth are alternated with nearly flat spaces of equal width, and do not reach the high portion of the building by several feet. The flat portion of the roof is carried across this space. This is designed to permit the wind to get through and cut out the snow which would otherwise bank in the corners, and the experience of the past winter seems to prove that it is effectual. Incidentally, it avoids interference with the lower row of windows on the high portion of building and gives more convenient access to the roof, as one can walk from end to end of the building on the flat portion of roof.

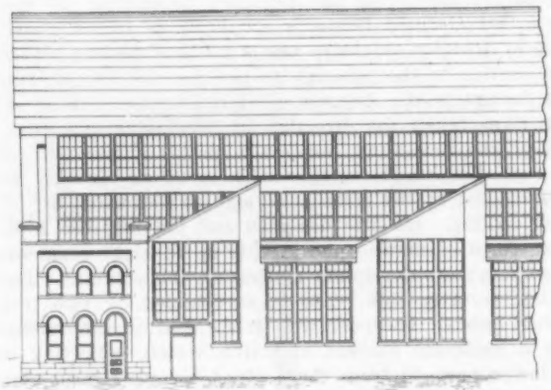


Fig. 1.—Side Elevation of Half of the Machine Shop, Showing the Special Arrangement of the Saw Tooth Roof.

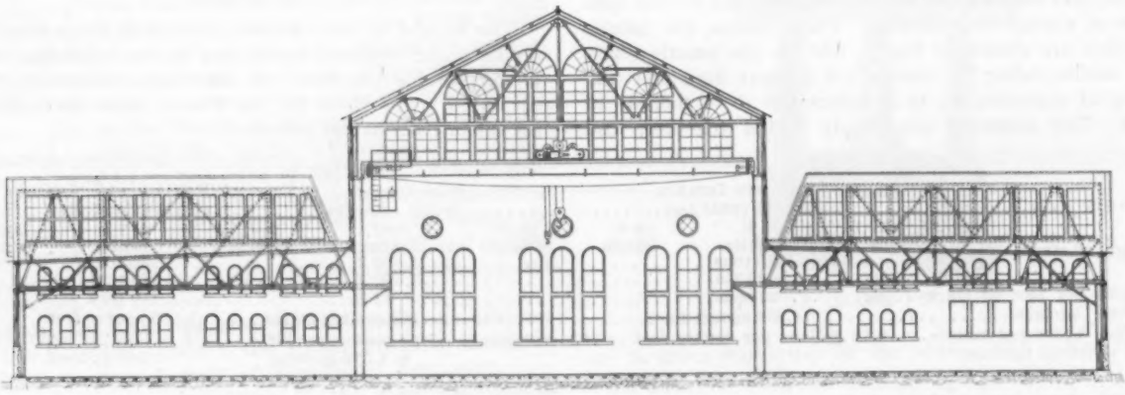


Fig. 2.—Transverse Section.

THE BALL ENGINE COMPANY'S NEW SHOP.

The floor, excepting tool foundations, consists of 12 inches of concrete, in which are imbedded 3 x 3 inch sleepers spaced 30 inches and covered with ⅞-inch maple. The heating system is indirect, with underground conduits. The exhaust from the shop engine is used in the heating coils without back pressure, there being a 10-inch exhaust pipe open to the atmosphere at all times. This is, perhaps, an unusual practice, but it works perfectly, even in the coldest weather. As steam is used for testing engines in exceedingly intermittent quantity and

at various pressures, it is necessary to have the boilers under easy control.

Two 150 horse-power Babcock & Wilcox boilers are installed. They are designed for 200 pounds working pressure, are fitted with controllable superheaters and are equipped with Dutch oven furnaces and forced draft. The blower performs a double duty. In addition to forcing air under the boilers it is connected to the down draft forges in the blacksmith shop, and so exhausts the smoke and gas formed there.

Pipes for compressed air are carried in the floor to all parts of the building and connections are brought out at convenient points. The erecting floor is covered by a Pawling & Harnishfeger crane of 70-foot span and 50,000 pounds capacity, with a 10,000-pound auxiliary hoist. The larger tools are arranged along one side only of this floor, thus not encroaching unduly upon the erecting floor, and not putting too much work on this crane. Three smaller cranes of the three-motor type run at right angles to this one and serve other tools. They run out under the main crane far enough so that work may readily be dropped by one and picked up by the other, so that it is never necessary to put work on a truck to transfer from one crane to another. These smaller cranes are arranged in alternate bays, the intervening overhead space being available for countershafting. They at present have but about 70-foot run, so that they do not tend as many machines as they are capable of, but part of the future extension plans consist in extending this portion of the shop 60 feet, thus giving them 130-foot run, which is as much as they can serve economically. Electrical driving is employed throughout.

When arranging the equipment of the engine shop, special attention was paid to the grouping of the tools so as to leave as much free floor space as possible and provide for the continuous movement of the work toward the erecting floor.

It will be noted in Fig. 3 that the crane system is so arranged as to allow for the easy handling of materials with as little trucking as possible. The main traveling crane running through the center of the shop, which it might be mentioned is kept chiefly as an erecting floor, is fed by a system of wall jib cranes covering all portions of the shop where heavy work is performed. This permits the conveyance throughout all machining processes of any heavy work entirely by means of the crane.

An interesting feature of the shop will be noted in Fig. 3, in a test block provided in the south end of the erecting floor. This is made of cast iron plates containing T-slots, so that any type of completed engine may be readily bolted in a true position and quickly coupled to the steam and exhaust mains for testing. This is facilitated by universally jointed piping.

The offices, foundry and pattern shop are still in the old location, but will eventually be transferred to the new site.

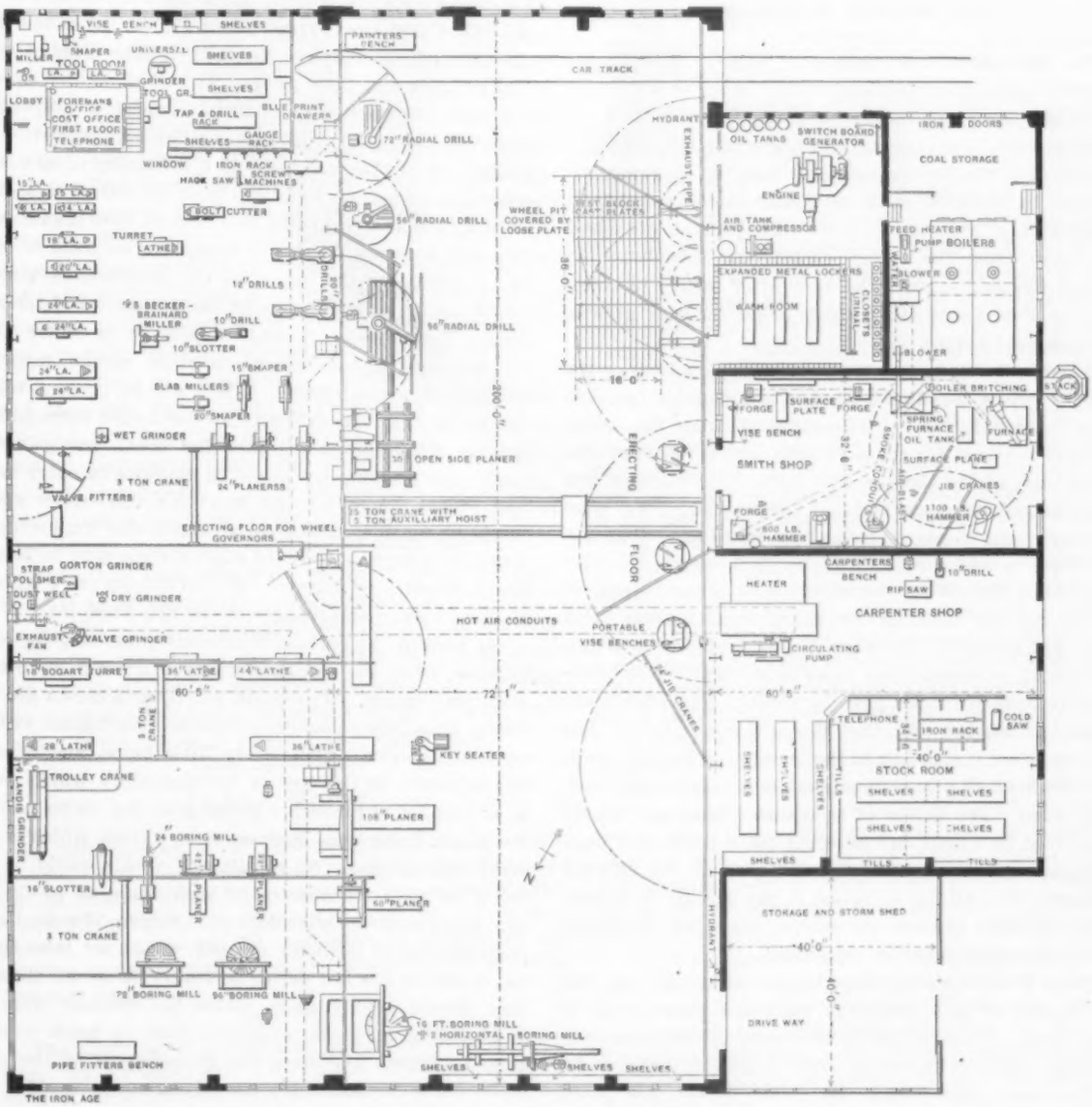


Fig. 3.—Floor Plan, Showing the Arrangement of Machinery Equipment.

THE BALL ENGINE COMPANY'S NEW SHOP.

The Iron Age

New York, Thursday, June 9, 1904.

DAVID WILLIAMS COMPANY, - - - - - - - - PUBLISHERS.
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GEO. W. COPE, - - - - - - - - - - ASSOCIATE EDITOR.
RICHARD R. WILLIAMS, - - - - - - - - - HARDWARE EDITOR.

The Volume of Money.

The decrease in the volume of money, both in the Treasury and in circulation, during May, is accounted for by the large gold shipments, and these in turn are accounted for, in greater or less degree, by the payments on account of the Panama Canal. Roughly speaking, the decrease in the total stock of money in the month was $30,000,000, a little more than three-fourths of which was taken from the money outside the Treasury. In spite of the gold exports the amount of money in circulation on June 1 was $127,000,000, or 5.3 per cent. greater than one year before.

It is impossible to find in the course of business or the range of prices any direct effect of the month's decrease or the year's increase. These figures, like the whole course of business for the past eight years, refute all the propositions of the cheap money advocates, whether free silverites or the more rational bimetallists. We were then told—and it was repeated four years ago—that dollar wheat would never again be seen unless the currency were diluted by the addition of silver coined on private account and an unlimited legal tender. But wheat has for some time been a good deal over a dollar. This might be seized upon as evidence that the increase of the currency in the past 12 months had stimulated prices but for the fact that the advance in wheat has been out of all proportion to the increase of the currency, while some other prices have remained nearly stationary or declined. The prices of iron and cotton are clearly determined by conditions affecting those particular commodities. Prices of all commodities must be affected similarly, if at all, by a change in the volume of money. Where changes present the widest range of variations individual causes must be recognized.

There is more money than there was a year ago, but the returns of bank clearings show that less money is being used. The situation is analogous to that of a railroad that adds to its rolling stock when the traffic is declining—more cars stand idle. The notion that more money is used because there is more money has been disproved again and again, but it dies hard. Prices have risen when there was a scarcity of currency but an eagerness to buy on credit; they have declined when money was abundant in bank vaults and the Treasury but men were indisposed to buy. Doubtless an abundance of money sometimes stimulates buying, but it does not uniformly operate so, and when it encourages speculation the actual advantage to the community is more than dubious.

Where money has depreciated as the result of large additions of a currency which, being irredeemable, is also unexportable, there have been advances in prices, but these were only nominal prices; the number of units was increased because the value of each unit had declined, but prosperity so produced is limited to a particular class, and what that gains other classes lose.

A comparison between the volume of the currency and the amount of bank clearings will show how insignificant an increase in the volume is compared with an increase in the rapidity of circulation. The foundations of the state of trade lie deeper than the conditions that can be changed by the Mint or the banks.

The High Cost of Steel for Ships.

Some of the witnesses who appeared before the Merchant Marine Commission have referred to the high price of domestic steel as one of the handicaps on the building of ships for the ocean carrying trade. At present prices for steel plates and angles, American shipbuilders on the Atlantic Coast are charged about $12 per gross ton more than British shipbuilders pay for the same class of material laid down in their yards. This is something over 40 per cent. increased cost which the American shipbuilder pays, as compared with the British shipbuilder. The higher cost of shipyard labor in this country is, of course, a much more serious handicap than the cost of steel. Possibly, as this is well known to American steel manufacturers, they have not deemed it incumbent on them to make any sacrifice for the benefit of the shipbuilders, since it would not be sufficient to meet the necessities of the situation. Nevertheless, it would appear to be sound policy for the steel manufacturers to make special rates for builders of ocean vessels. They are at present taking orders for export at prices very close to the rates paid by British shipbuilders. Orders for ocean going vessels might very properly be classed in the same category as export orders. A sale to an American shipbuilder should surely be considered as good a commercial transaction as a sale to a buyer located at some distant port in Mexico, South America or Europe. It would seem to be an easy matter to make an arrangement of this kind.

At present the outlook is not very promising for much business from the shipbuilders even if such an inducement was offered. The ocean shipping interests are suffering from other handicaps besides the higher cost of steel in America. Still, every little helps, and possibly the reduction in the cost of building ships which would be accomplished through a lower price for plates and angles might bring some business from a trade which is now practically lifeless. No sacrifice of profits would be suffered, as with the absence of such trade no profits are now being made on steel for ocean ships. The steel manufacturers need business, or they would not take orders for export at the low prices necessary to secure them. If they should even slightly revive the demand from the shipbuilding trade, it would be just so much tonnage gained. Those who have the management of the great plate and structural mills should seriously consider this matter. They should not permit themselves to rest under the imputation that they are in even the slightest degree responsible for the present prostration in the ocean carrying trade. As matters now stand, they have been arraigned at the bar of public opinion, and should free themselves from the danger of a particularly severe attack upon their methods of doing business.

When the Merchant Marine Commission makes up its report, giving a summary of the testimony presented to it, this is one of the points likely to receive careful consideration. It must be borne in mind that public sentiment regarding the necessities of our shipping interests is getting worked up to a high tension. If it should be shown that important American manufacturing interests are presenting obstacles to the development of the ocean carrying trade, a feeling of hostility may be engendered which will be seriously prejudicial to still greater interests. Export sales of American manufactures to foreign consumers at lower rates than to domestic buyers

are now being harshly criticised. In no line, however, do they appear to be operating so disadvantageously to other American interests as in the case of ocean shipping.

An active movement is in progress in New England in support of the negotiation of a reciprocity treaty with Canada. The sentiment toward Canadian reciprocity has always been strong in New England, but new life has been given to the agitation in favor of it by the activity of the Boston Chamber of Commerce. Through the energetic efforts of the officers of that body, the manufacturers and business men of New England have given their enthusiastic support to the cultivation of more widespread sentiment on this question. It is claimed that while reciprocity with Canada would be of especial benefit to the business interests of New England, it would at the same time operate greatly to the advantage of the entire northern border of the United States. Although the enthusiasm of those who are conducting this propaganda would seem to justify their hope of success, the movement appears to have little chance of accomplishment. Conditions have radically changed from those prevailing a few years since, when Canadian interests were earnestly seeking trade reciprocity. The manufacturing interests of Canada have attained such development that they feel entitled to their home trade. The policy of the Dominion Government appears to be in favor of thoroughly protecting domestic manufactures, even if it is necessary to go to extremes in that respect. Against such a policy we of the United States are not in a position to make any criticism or enter any protest. Our industries have been built up by the same methods. It would be of considerable advantage to us now if the Canadian Government should be willing to make a treaty for the free interchange of all the products of both countries. It is, of course, possible that some reason which does not now appear may influence Canada to favor such a step. Nevertheless it seems highly improbable.

Labor Notes.

At Albuquerque, N. M., on June 2, Judge Baker of the District Court made permanent the injunction restraining the striking Santa Fé machinists from molesting the company's property or interfering with non-union employees. A motion by the machinists to modify the injunction so as to permit them to converse with non-union men was denied.

The sheet metal workers of Boston have made a demand for an eight-hour day with a $3 minimum wage. Some of the employers have granted the demand.

The boiler makers employed by the Central New England Railroad have gone on strike out of sympathy with the boiler makers of the New York, New Haven & Hartford Railroad.

The International Association of Machinists have sent notice of a referendum vote to the members of the order, the vote to be on the question, "Shall a general strike be ordered in all shops affected by article 21, section 2 of the constitution; and are you willing to contribute the necessary assessments for the purpose of continuing the fight to a successful conclusion?" The article in question provides that after August 1, 1903, "no member of the association shall operate more than one machine or accept work by the piece, premium, merit, task or contract system under penalty of expulsion; and that in shops where such systems are now in operation they must be discontinued before July 1, 1904." The circular states that the General Executive Board gave the matter serious attention at their recent meeting at Washington, because of the changed condition of trade, and passed a resolution setting forth that "in view of the large number of strikes and lockouts now in progress and the present slackness of trade the Executive Board is of the opinion that the article could not possible be enforced excepting by a protracted strike involving thousands of members, which would render necessary the levying of assessments which might be in force for a considerable time." Therefore it was decided to submit the question to a referendum vote.

PERSONAL.

John H. Pierce, president of the Western Tube Company, Kewanee, Ill., has resigned on account of ill health. Mr. Pierce is succeeded by A. M. Hewlett, formerly vice-president of the company.

Theron J. Crané of Pilling & Crane, Philadelphia, has returned from Europe.

Charles E. Billings, head of the Billings & Spencer Company, Hartford, Conn., has retired from the Board of Fire Commissioners of his city, after 12 years as their president. On June 1 his associates presented him with a handsome and elaborate block and gavel of mahogany and silver. The occasion was a dinner given in honor of Mr. Billings and another retiring member of the board.

Henry C. Frick has stated that he will not be a candidate for United States Senator from Pennsylvania, to succeed the late M. S. Quay.

C. C. Tyler has resigned his position as superintendent of the works of the Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa., and has been appointed general superintendent of all the works of the Allis-Chalmers-Bullock interests in the United States. Mr. Tyler, who will enter upon his new duties on June 15, will make his headquarters at Milwaukee. His record in the practical management of great machine shops is one of the best in the country. Before Mr. Tyler went to Pennsylvnia he had made an excellent reputation, and at Pittsburgh, where he has been for half a dozen years, he enhanced this by the results he achieved in increasing the efficiency of the Westinghouse electric works. In entering upon his larger field of duty he is sure to carry with him the congratulations of the engineering profession. His appointment is another evidence of the care and strength by which the Allis-Chalmers Company organization is being wrought together.

Mason D. Pratt has opened an office for the conduct of a general engineering business at 18 North Third street, Harrisburg, Pa. For the past 13 years he has been connected with the Pennsylvania Steel Company, first as street railway engineer and latterly as engineer in charge of the construction of the new frog and switch shops.

Paul M. Mowrey, who for the last three years has been connected with the Merchants' Trust Company as adviser on industrial investments, has been made vice-president of the Engineering Company of America, 74 Broadway, New York. Mr. Mowrey has been prominently identified with the engineering and contracting business since 1888.

Powell Evans, who for some years has been vice-president of Merchant & Co., Incorporated, Philadelphia, has been elected president, to succeed the late Clarke Merchant.

Albert J. Pitkin, vice-president of the American Locomotive Company, has been elected president, to succeed the late Samuel R. Callaway.

Henry Jones has been appointed superintendent of the mills of the United Steel Company, Canton, Ohio, succeeding Henry W. Thomas, resigned.

Ernest Tietgens has been appointed superintendent of the Bessemer plant of the Republic Iron & Steel Company, Youngstown, Ohio, succeeding W. R. Edwards, deceased. Peter J. Gordon, superintendent of the blooming and billet mills, will be his assistant, in addition to his present work. Mr. Tietgens has been with the Bessemer plant for two years.

J. Langeloth, president of the American Metal Company of New York, has sailed for Europe.

On his retirement from the commissionership of the National Metal Trades' Association, E. F. Du Brul will take up the organization of a cement company to develop a property in Jackson County, Ohio.

The Navy Department's Plans.

All Vessels Authorized by Congress to Be Speedily Constructed.

WASHINGTON, D. C., June 7, 1904.—Orders have been given to expedite the preparation of the specifications for the battle ship and two armored cruisers authorized by the last naval appropriation act, and it is now expected that the contracts for these three vessels will be advertised early in September. This action by the Department is accepted as showing conclusively that whatever weight should be given to the suggestions of prominent members of the Senate Naval Committee that no more battle ships be built until opportunity has been afforded to study the lessons of the Russo-Japanese War, the Secretary of the Navy does not feel justified in disregarding the plain enactment of Congress. It is possible that if more than a single battle ship had been appropriated for an opportunity would have been given the House and Senate to reconsider the action taken, but as only one vessel of this type was authorized it is not regarded as judicious to establish a precedent for ignoring the statutes for the sole purpose of permitting Congress to take a second thought.

Characteristics of the New Battle Ship.

The general plans for the battle ship will closely approximate those for the "Connecticut" and "Louisiana," but in some respects there will be interesting departures. The value of the submerged torpedo as compared with the aboveboard installation is recognized in the plans and the latest type of this weapon will be installed. The general dimensions and features of the new battle ship are as follows:

Length of load water line	450 feet.
Breadth, extreme, at load water line	76 feet 10 inches.
Displacement on trial, not more than	16,000 tons.
Mean draft to bottom of keel at trial displacement	24 feet 6 inches.
Gross draft, full load, about	26 feet 9 inches.
Total coal bunker capacity, about	2,200 tons.
Coal carried on trial	900 tons.
Feed water carried on trial	66 tons.

The main battery of the battle ship will consist of four 12-inch, eight 8-inch and twelve 7-inch breech loading rifles, while the secondary battery will include twenty 3-inch 14-pounder rapid fire guns, twelve 3-pounder semiautomatic guns, six 1-pounder automatic guns, two 1-pounder semiautomatic guns, two 3-inch field pieces, two machine guns, caliber .30, and six automatic guns, caliber .30. The battery, both main and secondary, is still subject to modifications, but no change in the total weights is likely to be made. The engines will be of the vertical twin screw four-cylinder triple expansion type, aggregating 16,500 horse-power, and each engine will be located in a separate water tight compartment. There will be 12 water tube boilers, probably of the Babcock & Wilcox type, placed in six water tight compartments. A well equipped machine shop will be installed, the tools to be run by electric motors.

The Armored Cruisers.

The two first-class armored cruisers will be built after the general plans of the "Pennsylvania" and class, but a number of changes will be made to bring the equipment up to the latest approved naval practice. As in the case of the battle ship, submerged torpedo tubes will be installed in the cruisers, and electric motors will be employed for the operation of auxiliaries and machinery wherever possible. The general dimensions of these vessels will be approximately as follow:

Length on load water line	502 feet.
Breadth, extreme, at load water line, about	70 feet.
Trial displacement, about	13,800 tons.
Mean draft at trial displacement, about	24 feet 6 inches.
Greatest draft, full load, about	26 feet 6 inches.
Total coal bunker capacity	2,000 tons.
Coal carried on trial	900 tons.
Feed water carried on trial	75 tons.
Speed, not less than	22 knots.

The batteries of the cruisers have not yet been completely worked out, but will not differ greatly from those of the "Pennsylvania" and class, which included four 8-inch guns, fourteen 6-inch guns, eighteen 14-pounders, twelve 3-pounders, four 1-pounder guns, four 1-pounder rapid fire guns, two 3-inch field guns, two machine guns and six caliber .30 automatic guns.

Turbines for Scout Ships.

The plans for the hulls of the three scout vessels are being rather slowly worked out owing to the difficulties, heretofore referred to in this correspondence, that have been encountered in the endeavor to develop the required speed in connection with the limited tonnage and the necessary superstructure. The Bureau of Steam Engineering has gone ahead rapidly in the designing of the turbine engines and auxiliary apparatus, and this part of the task is well ahead of the hull designers. Whether the contracts for these vessels can be advertised on the same date with those for the battle ship and armored cruisers cannot be predicted, but it is believed there will not be much delay. Rear-Admiral George W. Melville, retired, who has just returned to this country from a European tour devoted to an investigation of the development in the use of turbines abroad, has given out an interesting statement in which he forecasts a strong recommendation that he will make to the Navy Department with regard to the installation of turbine engines as the result of his recent observations. He says:

We are 20 years behind the times in not having the turbine in operation. I shall recommend it to the navy, as I recommended it two years ago. Of course the limit of experimentation has not been reached, and in some ways the turbine may be said to be in its infancy. That is, no engineer would swear to it or guarantee specific results. But it is far past the stages of theory and the first stages of practical experiment, so much so that the Cunard line, although the shipbuilders would make no guarantee, has ordered two ships built with the turbine engines. The Cunard line deserves great praise for its grit in thus taking up the advanced idea. The navy will make a practical experiment shortly. Three scout ships are to be built. One will have the reciprocating engines now in use, while the other two will be equipped with turbines, one of the Parsons-Westinghouse type and one of the Curtis model.

I left here January 26 on the "Kaiser Wilhelm II," and disembarked at Plymouth. In London I had repeated interviews with Lord Selborne, First Lord of the Admiralty; with Rear-Admiral Sir John Durstan, Admiral May, Admiral Oram and Sir William H. White, former naval architect, and with the members of the Cunard line commission that was appointed to study the turbine. The English admirals gave me much information, and were much more liberal than the Cunard commission, which I found was pledged to secrecy. I went to the Clyde, to Belfast, and to several other shipbuilding places in the United Kingdom where turbines were building.

I found the whole of Europe alive to the problem of the new engines, although none were satisfied as to the claim of economy of coal and weight which is made for the turbine. There seemed to be no question as to the economy of space in the minds of the great engineers over there. All are anxious to build, but none will guarantee anything. In my visits to foreign shipyards I went to Stettin, Hamburg, Flushing and through some French yards. I found the French yards dabbling in the turbine to a small extent only. Of all the engines that I examined I found the Westinghouse "double flow" the best.

Colliers Will Be Built.

The naval appropriation act authorized the construction of two colliers "to be capable of accompanying the whole fleet; to carry 5000 tons of cargo coal, loaded; to have a trial speed of not less than 16 knots, and to cost not exceeding $1,250,000 each." It was further provided that these colliers should be build in the navy yards, one on the Pacific and the other on the Atlantic coast. It will be remembered that when the Navy Department was authorized to construct the battle ship "Connecticut" an appropriation of $175,000 was made "for the purpose of preparing and equipping such navy yard" as might be designated in which to build the vessel. In authorizing the construction of the two colliers Congress failed to provide a special appropriation, and the Secretary of the Navy has been in some doubt as to the course that should be pursued under the circumstances. It is the general impression in the Department that, aside from the Brooklyn navy yard, none of the yards either on the Atlantic or the Pacific possesses a slip at which the colliers can conveniently be built, and that no material is on hand with which to build such slip without a special appropriation. A circular letter of instructions has, therefore, been forwarded to the commandant of each of the large navy yards to furnish the Department at the earliest possible date with a statement of the facilities of the yard, so that the question may be determined as to whether the colliers can be built without further authority from Congress. In the meantime, however, there will

be no delay in getting out the plans and specifications for the vessels, as the slips will not be required for at least a year, and, should it be necessary to ask for an appropriation, such a request can be made in December and the money made available before Congress adjourns in March next. Owing to the special facilities installed at the Brooklyn yard for the construction of the "Connecticut," it is probable that one of the colliers will be built at that yard, while the other will probably go to the yard at Mare Island, Cal. W. L. C.

The Tin Plate Drawback Trade.

A Pittsburgh correspondent of the London *Iron and Coal Trades Review* recently furnished some interesting statistics to that paper relative to the American tin plate drawback trade. These statistics are based on the United States reports of imports and exports for the fiscal year ending June 30, 1903. He states that the statistics are of exceptional interest, because they cover the first eight months of the period in which the tin plate workers of the Amalgamated Association allowed the American Tin Plate Company a reduction of 25 per cent. in wages involved in making tin plate destined to supplant Welsh tin plate in the drawback market of this country. The statistics show that, in the fiscal year stated, drawback was allowed on only 2,252,239 pounds less of tin plate than in the previous year.

The special wage arrangement was made in October, 1902, so that it had been in operation only eight months when the fiscal year covered by the statistics ended. He says they do not therefore reflect the full force of the movement. It was reported at the time that most of the American orders had already been placed in Wales for some time ahead, and this appears to be borne out in the evidence. He says:

"The arrangement has been in operation to date about 18 months, during four months of which the collection was suspended. It will be recalled that the operation is as follows: From all Amalgamated Association wages in tin mills there is deducted 3 per cent.; these deductions accumulate in a fund, and when the American Sheet and Tin Plate Company pay to one of their customers a rebate (such rebate being from the regular market price which the customer has paid, and much more than the wage difference) there is paid to the company, from this fund, an amount equaling 25 per cent. of the wages originally involved in making the tin plate. The fund at the present time is about $70,000, and we estimate roughly that this equals about 4,000,000 boxes of tin plate, while during the 14 months that the collections have been made there has probably been collected the 3 per cent. on about 8,000,000 boxes, so that something like 4,000,000 boxes of tin plate have contributed to rebate payments actually made, which would fix such rebate at about 480,000 boxes, or, say, 40,000,000 to 45,000,000 pounds. This is roughly the amount of business the Welsh tin plate makers have lost to date through the operation of this wage concession, added to the much larger concession which the United States Steel Corporation make out of their own profits. There is about an equal quantity represented in the fund, and the claim is made that orders have actually been filled for approximately this additional quantity, the fund being at the figure named simply because it takes time to make the tin plate into cans, &c., and export the product, while the claim for rebate may not be made on the company for some time thereafter. The company allow their customers two years from the time of purchase of the tin plate in which to claim the rebate.

"The drawback tin plate trade has not been as heavy of late as it has been in some previous years. Below we give a table showing the statistics since the drawback arrangement was put into effect by the Government. The figures indicate the number of pounds of tin plate on which the Government allowed drawback during the fiscal years named; the importation of such tin plate having, of course, preceded by some time the allowance of drawback:

Year ended June 30,	Pounds.	Year ended June 30,	Pounds.
1884	97,415,089	1894	161,758,361
1885	127,125,903	1895	126,777,800
1886	136,539,316	1896	137,659,779
1887	123,203,627	1897	139,246,130
1888	108,271,542	1898	137,897,570
1889	166,087,740	1899	122,906,682
1890	150,112,007	1900	125,269,156
1891	149,599,649	1901	127,261,883
1892	119,928,083	1902	125,340,511
1893	128,863,227	1903	123,088,272

"Of late years these 'drawback' tin plates have constituted nearly the whole of our tin plate imports, as will be shown in the following table, which is constructed, not from the statistics of general imports, as usually reported, but from the 'entries for immediate consumption and withdrawals from warehouse,' which represent the movement more accurately. The 'general imports' which are published monthly, cover imports for immediate consumption and for warehouse, the two differing by the amount that stocks in the customs warehouses differ. The difference is as follows in pounds:

Fiscal year ended June 30,	Excess imports over drawback.	Excess drawback over imports.
1898	34,013,656	.....
1899	.....	11,792,801
1900	17,329,441	.....
1901	.....	6,800,739
1902	74,511,879	.....
1903	.....	12,878,001
	125,854,976	31,471,541
	31,471,541	.....
Six years' imports for domestic consumption	94,383,435	.....
Annual average	15,730,572	.....

"Thus for six years we have imported, for actual ultimate consumption in the United States, only about 150,000 boxes per annum, this being the amount on which 1½ cents a pound duty was actually paid and not refunded by the Government. They include only fancy charcoals and ternes, where for special reasons the consumer desired imported plate even at the higher price."

Supplementing the statistics given by the correspondent above referred to, we have secured from the Bureau of Statistics of the Department of Commerce and Labor the monthly figures of the quantity of tin plates on which drawback was paid for the months following the close of the fiscal year 1903 and ending with March of this year, which is the latest month for which such figures are procurable. These figures are as follows:

Months.	Pounds.	Drawback paid.
July, 1903	11,622,482	$172,616.85
August	7,316,184	108,644.86
September	3,568,447	52,991.34
October	6,087,146	90,394.17
November	12,044,108	178,851.52
December	11,381,735	169,018.27
January, 1904	9,349,550	138,840.68
February	8,290,706	123,117.28
March	11,485,562	170,556.85

The total quantity of tin plates on which drawback was paid in these nine months was 81,145,920 pounds. The total imports for the same period amounted to 83,322,045 pounds. This shows that practically the entire importations of tin plate during this period were made under the drawback provision of the tariff. Assuming that the importations for the remaining three months of the current fiscal year would be made at the same rate, the total amount on which drawback will be paid will be 108,194,556 pounds. This is some 15,000,000 pounds less than the quantity on which drawback was paid in the preceding fiscal year, and is smaller than the figures for any previous year as far back as 1888. These figures indicate that the domestic manufacturers are now making greater inroads upon the drawback tin plate trade.

Machinery Hall, unlike the other buildings at the St. Louis World's Fair, is not closed in the evening. It is open until 11 p.m., and visitors will find at work there, among other objects of interest, the 5000 horse-power Allis-Chalmers-Bullock engine and generator producing the electric current to keep aglow the 120,000 or more decorative lights which glitter all over the buildings and grounds.

The American Foundrymen's Association.

INDIANAPOLIS, IND., June 7, 1904.—*(By Telegraph.)*—The American Foundrymen's Association are undertaking some highly important work in their ninth annual convention, which is in session here this week. They have appointed committees to act with the American Association for Testing Materials, with the view to formulating standard specifications for pig iron, gray and malleable iron castings and foundry coke. They are also working out a method for measuring the hardness of molds and instructions for the formation of molds. A plan for equitable insurance of patterns against fire loss is also in the hands of a committee. During the three days' session 20 or more important papers will have been read and discussed.

The members and guests arrived at the Claypool Hotel this morning, and after registering in the association roll book were taken through the plant of the Atlas Engine Works as guests of that company and of the local Reception Committee. The Atlas foundry was of particular interest because of the use of varied types of molding machines for an unusually wide range of work. The systems of cranes, hoists, trolleys and sand chutes were also carefully studied.

OPENING SESSION.

The first session of the convention was called to order by President Willis Brown at 2.30 p.m.in the convention hall of the Claypool Hotel. Mayor Holtzman delivered an address of welcome, in which he commended the association for the educational work that it was doing and spoke of the dawn of a new day in industrial affairs, in which the workman is being given consideration as a man and independent of his dollars and cents value as an employee. Governor Durbin, who was on the programme, was not present. John W. Kern, president of the Commercial Club, delivered an address of welcome on behalf of the manufacturing and business interests of the city. To both addresses President Brown responded happily, complimenting the city for many things, but particularly for the fact that it was the headquarters of a national association that was earnestly attempting in its own way to solve the problems that exist in labor circles. While Boston had been called the cradle of our civil liberties, President Brown expressed the belief that Indianapolis, through the efforts of the association in question, might earn the proud distinction of being the cradle of our industrial liberties.

President Brown's Annual Address.

The president followed with his annual address. He referred to the importance of members attending the convention in person rather than contenting themselves with reading the printed reports, and dwelt on the great educational value of the sessions. He congratulated the association on what he termed the beneficent assimilation of the Foundry Foremen's Association and expressed the conviction that the merger had been of great advantage to both the foremen and the employers. He spoke in praise of the masterly manner in which Dr. Moldenke, the secretary, had carried out the wishes of the association in editing and publishing the American Foundrymen's Association *Journal*, and urged members to give it better moral and financial support than they had done in the past. In reviewing present trade conditions he spoke of the difficulties attending the conduct of a business at a time when values are constantly declining and felicitated the members on having been able to accommodate themselves to the new low lines. He expressed the hope that the day would never come when pig iron would be a speculative commodity to be tossed about by bulls and bears on stock exchanges. He spoke for a better understanding of costs of production so that foundrymen would not be competing with each other on a ruinous basis born of imperfect knowledge of costs or carelessness in estimating. Instead of competition being the life of trade, he believed that reciprocity might bring a better life than the warfare of competition. Said he:

"One foundryman will spend hours or days in running down the actual cost of getting out the material on a contract and bases his estimates on facts. Another one looks at the patterns, the blue prints, and scarcely reads the specifications, and guesses that it will classify with something that he has made before and underbids the actual facts, say, ½ cent per pound in castings, or $10 per ton on the pig iron; and in like manner reaches an estimate on the machine work from 10 to 20 per cent. below the facts, and secures the contract and loses money. On the year's business he may cover those losses by more fortunate guesses, but it is a game of chance. He not only does his competitors an injury, but he injures himself. He sets up a false standard of costs, which must be met and overcome for months by the patient missionary work of those who do not guess at the cost of production. It is bad enough to deceive your fellow man, but it is worse to deceive yourself, worse for you. Cannot we get together and agree upon some suitable basis in figuring the costs of production and then let the quality of our work, and the time in which it can be produced, be largely the factors which win? Is not the suggestion founded upon the essence of the best political economy? The result under such a system would probably be that the best equipped factory would turn out the best work, in the shortest time and for the least money, and would set the pace. That is right and proper. It is progress. We must keep up with the column or be cut off."

The president also spoke for a more liberal introduction of labor saving machinery, and advised members to experiment with molding machines until they found machines suited to their particular work.

Dr. Moldenke's Report.

The report of the secretary-treasurer stated that the solutions of labor problems during the past year had diverted much of the energy of the association away from the purely educational side of their work. He spoke of the importance of the proposed specifications for standizing pig iron and gray and malleable castings, and expressed pride in the knowledge that it was this association which had inaugurated the important movement and would be given the credit when the new standard was an accomplished fact. The standardizing of coke was also urged as a matter of great importance just now, when by-product coke was coming into the market with standards differing greatly from the Connellsville cokes. The American Foundrymen's Association, said he, is held up as the model educational foundry association to be patterned after in other countries. Its officers, committees and members are doing work of the utmost educational and industrial value to the art the world over. He continued:

"Standardization of method, system in the shop, harmony between the various crafts grouped about the commercial production of castings, and finally the finesse in management which has made our country take the first industrial position of the world—all this combined has been the trend of our ambition, and we are steadily gaining as we learn how to grasp the fruits of American ideas and perseverance and apply them to the foundry."

The secretary expressed regret and surprise that not one foundry owner had ordered a supply of instruction papers which had been printed by the association, while the foremen's associations had ordered liberally at their own expense on behalf of the apprentices in their shops, and that the demand for these papers from foreign countries was great. Dr. Moldenke reviewed briefly the conditions of the *Journal* of the association, and stated that the support given it had been so unsatisfactory that he recommended that it be discontinued as a trade publication. As an example of the indifference against which the paper had to contend, the secretary told of having sent out sample copies and three different circular letters to a list of 1500 foundries, with a total result of five subscriptions. The membership of the association was reported to be 278, as against 316 last year—a decrease of over 13 per cent. The secretary suggested that the dues be greatly reduced and efforts be made to increase the membership.

Other Reports.

Thomas D. West, chairman of the Committee on Standardizing Bureau, reported that the demand for samples had exceeded the ability of the committee to supply. The great demand for these samples was an indication of their usefulness in filling a gap in the fur-

nace and foundry laboratory. Mr. West also read a report of the financial balance sheet of the committee.

J. S. Seaman of Pittsburgh, chairman of the Committee on Trades School, reported that 32 acres of land had been given by the city of Pittsburgh for the Carnegie Technical School, the land adjoining Schenley Park, and that the city had already expended $80,000 in preparing the land for building. Fifty architects, at home and abroad, were working on competitive plans for the buildings. Professor Hammerschlag, who had active charge of the erection and equipment of the schools, was in close touch with some 60 trades and organizations, endeavoring to secure from each the best advice as to plans for buildings and equipment which would best suit the craft in question. It is understood that the foundry section of this institution will be, in fact, a fully equipped modern foundry on a large scale, able to do all work from the heaviest to the lightest. In this way a proposition originally proposed by the Pittsburgh Foundrymen's Association, and later espoused by the national association, had developed, thanks to Mr. Carnegie's co-operation, into what will prove to be the greatest technical school of the kind in the world.

James A. Murphy, secretary of the Foundry Foremen's Association, reported that during the last year his association had increased its membership from 100 to 200 and had money in bank. Branch associations were being formed in several cities.

The secretary read a report of the committee appointed to draft insurance regulations that would give just protection against loss by fire. This report showed that conferences had been held with the National Board of Fire Underwriters looking to the adoption of a special pattern clause or rider on the basis of an annual depreciation in wooden patterns from date of last use amounting to 10 per cent. and 5 per cent. depreciation per year on brass patterns, with the proviso that customers' patterns be not subject to depreciation and that the foundry keep accurate card records of the use and dispositions of patterns.

H. E. Field, chairman of Committee on Instruction Papers, reported that following the instructions given at the last annual convention four instruction papers had been published and sent to members, two on the subject of molding and two on metallurgy, and that a third series would soon be issued. He recommended that in case the association concluded to continue the work experts be employed to prepare articles on pattern making and foundry accounting.

Mr. Field, as secretary of the Metallurgical Section, also reported that a number of members had been added during the year, but suggested that dues be reduced in order to encourage a large enrollment in that section, or that the Metallurgical Section connect itself with the Foundry Foremen's Association, whose dues are lower. He reported that satisfactory progress was being made in the matter of standardizing iron analysis and that a committee of chemists from foundries, furnaces and independent laboratories had been organized to assist in the work.

Other Proceedings.

Thomas D. West read a paper on "Standard and Systematic Methods for Making Beds," showing a model of his testing apparatus. The paper also gave explicit instructions for making hard and soft beds which were intended as a basis for arriving at a definite standardization. This paper elicited spirited discussion.

John Magee, Chelsea, Mass., presented a resolution from the New England Foundrymen's Association asking for the appointment of a committee to go into the subject thoroughly with a view to adopting definite standards. The chair at the next session appointed Thomas D. West, E. D. Gilmore, J. A. Murphy, C. H. Thomas, A. M. Loudon and David Reid.

The last subject on the programme for the afternoon session was "The Standardization of Foundry Coke." On this subject Dr. Moldenke said: "Tradition had been upset by the advent of the poor looking but splendid by-product coke with its low ash and sulphur." The question of moisture came up also and it was stated that a movement is now on foot in Germany to limit moisture to a fixed point, say 3 per cent., above which the buyer may demand a rebate. In the same way Dr. Moldenke suggested that the association adopt a limit for moisture, sulphur and ash, beyond which the seller would have to make rebates in proportion to the excess and below which the buyer would pay bonuses for excellence. He suggested the following basis: Ash, 10 per cent.; sulphur, 1 per cent.; moisture, 1 per cent., also that the convention request the American Society for Testing Materials to take up the question of coke inspection jointly with this association. A general discussion on the coke situation, with particular reference to by-product coke, followed.

TUESDAY EVENING SESSION.

The chairman announced the following committees: Auditing, William Yagle, J. S. Seaman, S. H. Stupakoff. Nominations, John Magee, William Yagle, H. E. Diller, J. P. Golden, C. H. Thomas.

Geo. H. Hull of New York read a paper on

The Proposed Trading in Pig Iron Warrants.

He said that the construction work on the Pennsylvania Railroad work in New York would call for the delivery of such large quantities of iron at fixed dates and prices as to appal the foundryman in the face of possible fluctuations of $10 a ton or more, and in the face of a possible shortage of supply. Labor disturbances were another feature that made it dangerous for foundrymen to contract to deliver stated quantities of castings at stated times. All these conditions, Mr. Hull argued, made it plain that a reserve stock of iron would at all times serve as a balance wheel, preventing startling changes in prices and dissuading labor leaders from calling strikes. Eight times within the last 80 years, he said, this country had suffered from famines in iron and the crippling of scores of other industries. A famine in iron with advance in price from 200 to 300 per cent. works more injury to the industries of the country than any other shortage. In the last few years it has frequently happened that the total stock of iron on hand in the country was not more than one day's supply.

A contract with a strike and accident clause was characterized by Mr. Hull as a delusion and a miserable fallacy, that was in effect no contract at all. In Scotland, when a foundryman takes a contract for a large tonnage of castings, he goes to a warrant dealer and makes a contract for a corresponding quantity of iron, the cost being the current price plus the cost for storing the iron for the space of time during which protection was required. The Scotch system created a demand for iron and led to the creation of a surplus stock equivalent to eight months' supply. A pig iron warrant by the Scotch system is as good as a Government bond and can be used as collateral at any time with any bank.

If the American foundryman wishes to be on the same safe basis as the Scotchman he must first refuse to buy iron on strike or accident clause contracts. This will force the furnaces to sell warrants or to store iron. As a matter of fact, the iron consumer does not buy his current iron supplies by warrants, but buys his iron in the usual way and buys warrants as a sort of insurance to eliminate all risks. The per capita consumption of iron is increasing yearly and the only way to prevent another famine is to lay up an ample store. Think of the absurdity of an attempt of the United States to control the iron business of the world when we have only 21 days' supply of iron on hand at any time. When Alabama iron fluctuated 300 per cent., owing to the famine here, the price fluctuated only 69 per cent. in Scotland.

The reading of the paper was followed by a general discussion, in which Mr. Hull explained in detail the method and cost of doing a warrant business in Scotland.

E. H. Mumford of Philadelphia read a paper on "Molding Machines," in which he predicted that the time would come when there would be scores of different machines suited to different uses, and that a majority of the so-called molding machines that are in use to-day would be on the scrap heap. He described the present types of machines and their usefulness.

A discussion followed as to the comparative excellence of Eastern and Western castings, and the difference between the foundry practice of the West and East. David

Spence of Chicago gave a recipe for preventing scabbing.

W. H. Carrier, Buffalo, discussed "Cupola Fan Practice," and contended that foundrymen were securing too low a percentage of efficiency from coke consumed. Some of the figures given in his paper as to the ratio between coke and iron in the cupola led to a spirited discussion, which consumed the last hour of the session.

Pig Iron Producing Capacity Sharply Reduced.

A Large Increase in Stocks.

The sudden reversal in the statistical position of the pig iron industry is very well reflected in the accompanying figures and furnishes an ample explanation of the change in sentiment which has taken place during the past few weeks. We had rushed altogether too rapidly back into the production of iron, jumping from a rate of 308,000 tons per week on March 1 to 368,000 tons per week on May 1. It is true that during that time we were drawing down our stocks in the hands of merchant furnaces at a steadily declining rate. With the very large rate of output reached during April the matter had been overdone, and now we witness an accumulation of about 100,000 tons of pig iron during June, accompanied fortunately by a very pronounced falling off in the current production.

Coke and Anthracite Furnaces in Blast.

Location of furnaces.	June 1. Number of stacks.	June 1. Number in blast.	June 1. Capacity per week.	May 1. Number in blast.	May 1. Capacity per week.
New York	18	6	9,483	6	9,267
New Jersey	8	3	4,032	4	4,710
Spiegel	2	1	125	2	259
Pennsylvania:					
Lehigh Valley	27	14	9,575	14	9,150
Spiegel	2	2	365	2	375
Schuylkill Valley	13	7	9,052	9	9,760
Low. Susquehanna	10	4	6,229	4	6,319
Lebanon Valley	11	3	2,400	3	2,317
Spiegel	1	1	518	1	811
Pittsburgh Dist	37	33	85,570	36	97,478
Spiegel	3	3	2,535	3	2,586
Shenango Valley	19	11	20,302	12	24,302
West. Penn	18	12	16,725	13	19,724
Spiegel	1	1	1,257	1	983
Maryland	5	3	5,544	3	4,836
Wheeling Dist	12	10	20,116	10	21,672
Ohio:					
Mahoning Valley	15	12	26,970	12	24,596
Cent. and North	16	11	24,411	13	28,830
Hocking Valley	2	1	203	2	642
Hanging Rock	12	6	4,908	6	4,679
Michigan	1	1	1,568	1	1,307
Illinois	20	13	32,303	15	37,900
Spiegel	2	0	0	2	2,464
Minnesota	1	0	0	0	0
Wisconsin	5	4	4,663	4	4,738
Missouri	1	1	722	1	700
Colorado	5	1	1,493	1	1,410
The South:					
Virginia	23	10	7,148	11	7,339
Kentucky	8	2	672	2	692
Alabama	42	26	30,016	27	30,787
Tennessee	16	10	6,391	10	6,561
Georgia	1	1	901	1	1,051
North Carolina	1	0	0	0	0
Totals	358	213	336,197	231	368,244

For a series of months the active anthracite and coke furnace capacity fluctuated as follows:

	Coke capacity per week.		Coke capacity per week.
June 1, 1904	336,197	February 1	335,839
May 1	368,244	January 1, 1903	346,073
April 1	337,257	December 1, 1902	336,617
March 1	308,751	November 1	330,110
February 1	273,692	October 1	337,837
January 1, 1904	185,636	Septemhber 1	328,243
December 1, 1903	244,156	August 1	328,745
November 1	273,715	July 1	303,793
October 1	353,142	June 1	337,492
September 1	360,197	May 1	337,627
August 1	353,681	April 1	331,140
July 1	384,825	March 1	316,039
June 1	388,178	February 1	325,440
May 1	373,496	January 1, 1902	291,902
April 1	368,215	December 1, 1901	317,358
March 1	347,424		

In May there were blown out Oxford and one New Jersey spiegel furnace in New Jersey, two Henry Clay in the Schuylkill Valley, Neville Island, one Edgar Thomson and one Isabella in the Pittsburgh district, Atlantic in the Shenango Valley, Claire having followed on the 4th inst.; two Central furnaces at Cleveland, and New York in the Hocking Valley. In the Chicago district one Iroquois, one North Works spiegel and two South Chicago furnaces have blown out, while in the Mahoning Valley Hannah furnace of the Republic Iron & Steel Company is now idle. In the South one Longdale in Virginia and one Pioneer in Alabama have stopped.

Very few furnaces were blown in during May. These include Allegheny in Virginia and No. 3 Ohio furnace of the Carnegie Steel Company.

Production of Steel Companies.—Returns from all the plants of the United States Steel Corporation, the Cambria, Pennsylvania, Maryland, Lackawanna, Wheeling, Ashland, Republic, Johns & Laughlin, Clairton, La Belle, Bethlehem and Colorado companies show a total product of 972,534 tons for May, as compared with 974,006 tons for April, 913,412 tons for March, 756,230 tons for February, 502,994 tons for January, 406,730 tons for December, 553,067 tons for November, 829,215 tons for October, 956,363 tons for September, 993,564 tons in August, 987,855 tons in July, 1,021,839 tons in June, 1,037,325 tons in May and 966,850 tons in April.

Production of Spielgeleisen.—The production of spiegeleisen and ferromanganese was 25,755 tons for May, as compared with 29,145 tons for April, 23,128 tons in March, 12,961 tons in February, 6673 tons in January, 15,394 tons in December, 17,695 tons in November, 10,374 tons in October, 8406 tons in September, 15,862 tons in August, 14,933 tons in July, 16,309 tons in June, 17,600 tons in May and 11,755 tons in April.

Monthly Coke and Anthracite Pig Iron Production.

	January. (31 days)	February. (29 days)	March. (31 days)	April. (30 days)	May. (31 days)
New York	32,577	35,599	41,788	41,507	41,996
New Jersey	19,910	20,380	21,326	21,298	20,182
Lehigh Valley	35,735	35,038	38,348	41,184	44,022
Schuylkill Val.	23,918	24,309	24,047	30,293	43,159
Lower Susquehanna and Lebanon Valley	17,469	28,829	29,364	37,325	40,498
Pittsburgh dis.	248,024	328,848	398,464	422,572	407,482
Shenango Val.	31,445	76,108	91,872	104,151	95,152
West. Penn	85,186	93,877	94,790	96,134	79,636
Md., Va. and Kentucky	56,169	54,277	58,668	55,145	58,182
Wheeling dis.	21,089	66,067	78,646	86,658	89,085
Mahoning Val.	59,932	65,511	102,356	113,761	121,501
Cent. and No. Hocking Valley and Hanging Rock	41,491	80,374	99,253	114,100	105,412
	17,250	24,819	30,353	23,676	23,334
Ill.,Minn.,Wis., Mo. and Col.	73,956	122,892	176,678	204,108	197,827
Alabama	123,991	119,062	128,947	132,245	135,982
Tennessee, Ga. and No. Car.	33,089	29,459	32,165	31,110	30,080
Totals	921,231	1,205,449	1,447,065	1,555,267	1,533,350

We estimate the production of the anthracite and coke furnaces monthly as follows:

	1903. Gross tons.	1904. Gross tons.
January (31 days)	1,472,788	921,231
February (29 days)	1,390,615	1,205,449
March (31 days)	1,590,470	1,447,065
April (30 days)	1,608,431	1,557,267
May (31 days)	1,713,614	1,533,350
June (30 days)	1,673,228	.....
July (31 days)	1,546,184	.....
August (30 days)	1,571,126	.....
September (31 days)	1,553,717	.....
October (30 days)	1,425,658	.....
November	1,039,622	.....
December (31 days)	846,695	.....

Stocks.

Believing that a classification of the merchant stocks by general geographical divisions would aid in a correct appreciation of the situation, we have arranged them in three groups: The Eastern, which includes New York, New Jersey, and the Schuylkill, Lehigh, Lower Susquehanna and Lebanon valleys; the Central Western and Northwestern, which includes Western Pennsylvania, the Shenango and Mahoning valleys, the Hanging Rock region, Central and Northern Ohio, and Michigan, Illinois,

Wisconsin, Minnesota and Missouri; and the Southern, which includes Virginia, Kentucky, North Carolina, Georgia, Alabama and Tennessee. The stocks, of course, do not include the holdings of the steel companies:

Merchant Furnace Stocks.

	February 1.	March 1.	April 1.	May 1.	June 1.
East	87,712	79,520	71,230	74,637	90,492
Central and Northwest	217,080	188,686	161,971	145,394	212,312
South	271,610	261,339	224,712	224,028	243,088
Totals	576,402	529,545	457,913	444,059	545,892

It will be observed that of a total increase in the stocks of 102,000 tons, 67,000 tons, or more than one-half, must be credited to the Central West, the Mahoning and Shenango valleys alone contributing 38,000 tons of the additions to supplies on hand.

May Fluctuations in Iron Stocks.

The following table shows the fluctuations in quotations of the stocks of iron and steel companies in the month of May, with the dates on which the highest and lowest prices on each stock were realized:

		Lowest.	Date. May	Highest.	Date. May
.....	Allis-Chalmers, com....	6	18	7¾	26
.....	Allis-Chalmers, pref....	39½	11	42	9
$41,233,300	Amer. Can, com.....	3⅞	31	4⅝	2
41,233,300	Amer. Can, pref.....	34½	21	36⅝	2
29,000,000	Am. Car & F'dry, com..	16	16	17⅞	6
29,000,000	Am. Car & F'dry, pref..	67	16	71	5
24,100,000	Am. Locomotive, com..	17¼	20	20½	23
25,000,000	Am. Locomotive, pref..	81	25	84	7
45,000,000	Cambria Steel.....	18	25	20	7
17,000,000	Colorado Fuel & Iron..	28½	26	32¼	6
25,000,000	Crucible Steel, com.....	4½	27	5	6
25,000,000	Crucible Steel, pref....	35	2	38	2
.....	Dominion Iron & Steel.	9¼	31	12	11
4,449,800	Otis Elevator, com....	30	24	30	24
6,350,000	Otis Elevator, pref....	85	24	86	14
12,500,000	Pressed Steel, com.....	24¼	16	27⅝	5
12,500,000	Pressed Steel, pref....	66½	18	71½	2
10,000,000	Railway Spring, com..	15⅞	20	18	2
10,000,000	Railway Spring, pref..	75	19	75	19
27,191,000	Rep. Iron & Steel, com.	6	16	7	23
20,306,900	Rep. Iron & Steel, pref.	37	13	42½	3
7,500,000	Sloss-Shef. S. & I., com.	36	27	38	3
6,700,000	Sloss-Shef. S. & I., pref.	79¾	13	84	27
20,000,000	Tennessee Coal & Iron..	31⅝	16	36	3
12,106,000	U. S. C. Pipe, com.....	6¼	24	7	31
12,106,000	U. S. C. Pipe, pref.....	41½	25	42	31
510,361,300	U. S. Steel Co., com....	8⅝	14	10⅝	2
508,511,200	U. S. Steel Co., pref....	51¼	13	56	2
.....	U. S. Steel Co., new 5s.	71⅝	17	74	2

Iron and Industrial Stocks.

The course of the stock market during the past week developed no general tendency. Industrial stocks, as well as railroad stocks, seemed to be firmly held, notwithstanding the extreme dullness existing. The stock market has for some time been about as apathetic as the iron market. A little change from the general quietness was a decline in International Steam Pump common, which sold on Tuesday down to 31, the lowest point of the year. This decline was not accompanied with any information regarding its probable cause, but it was rumored that it indicated the fear that the dividends may no longer be continued on this stock. Fluctuations on the general line of iron stocks were quite small, among the most important having been the range of Tennessee Coal from 32¾ to 34, United States Steel preferred 52¾ to 53¾ and American Can preferred 35¼ to 37¼. United States Steel stocks were strong on Wednesday. Last transactions in active stocks up to 1.30 p.m. on Wednesday were made as follows: Car & Foundry common 16⅜, preferred 70½; Locomotive common 19, preferred 81; Colorado Fuel 29; Pressed Steel common 26, preferred 68; Railway Spring common 17, preferred 74; Republic common 6¼, preferred 38½; Sloss-Sheffield common 35¼, preferred 82; Tennessee Coal 34; United States Steel common 9⅛, preferred 54⅝, new 5's 74⅜.

Dividends.—International Silver Company have declared a quarterly dividend of 1 per cent. on preferred stock, payable July 1.

MANUFACTURING.

Iron and Steel.

The Amsler Engineering Company, engineers and contractors, Empire Building, Pittsburgh, have a contract for relining a blast furnace stack and four hot blast stoves for the American Steel & Wire Company, at Cleveland, Ohio. They have also secured a contract from the W. H. Hamilton Company for a 20-ton continuous tank furnace at their glass plant at Charlerol, Pa., are putting in a new cap for the Warner Glass Company at McDonald, Pa., and are making extensive repairs at the plant of the Flaccus Glass Company, at Tarentum, Pa. They have numerous other smaller contracts on hand.

Hannah Furnace of the Republic Iron & Steel Company, at Youngstown, Ohio, was blown out last week. Atlantic Furnace of this company, at New Castle, Pa., was blown out about three weeks ago.

Claire Furnace of M. A. Hanna & Co., Sharpsville, Pa., will probably go out of blast this week.

The Mark Mfg. Company are operating their pipe mill plant, recently purchased, at Zanesville, Ohio. This is the plant formerly known as the Eastern Tube Company, which was bought in by the Mark Company under foreclosure. It has a capacity for about 500 tons of pipe per day, ranging up to and including 16-inch diameter. The company will also make a complete line of lap weld steel and iron boiler tubes.

Recent reports that the National Tube Company have just awarded contracts to the American Bridge Company for the large steel buildings for their new works at McKeesport, Pa., are incorrect. The contracts for these buildings were awarded by the National Tube Company to the American Bridge Company some months ago.

F. W. Wurster & Co., Brooklyn, N. Y., rolling mill and axle works, have incorporated their business with a capital stock of $200,000. The incorporators are F. W. Wurster, E. T. Horwill and F. W. Wurster, Jr.

Howard M. Long, T. J. Campbell and Charles Sinkler of Philadelphia, appointed trustee appraisers of the property of the Saxton Furnace Company, Saxton, Pa., have visited the plant and made a preliminary report, in which the property is appraised at $400,000. They say that they will probably sell the plant.

The Pennsylvania Steel Company will erect at Steelton, Pa., an addition to their bridge and construction shops, 160 feet long and the width of the present plant. The construction work will be of brick and steel, with stone foundations. The bridge shops were moved into their present quarters about two years ago, and already the new shops are too small for the ever-growing business of this branch of the company. During the recent slump in steel industries, when all other departments of the steel company were working half time, or little more, the bridge shops were run double time on big orders. At present iron is being turned out for the new Blackwells Island bridge, New York.

The Elwood Ivins Tube Works, Oak Lane, Philadelphia, Pa., report increasing orders for their new product, seamless tool steel tubes, a substitute for all purposes where rods were formerly bored out to meet the specific requirement. These tubes, they advise us, are made extremely accurate, both inside and outside, as per order to micrometer gauge in sizes from 1-64 to 2 inches in diameter. They also manufacture soft steel, brass and copper tubing.

The Igoe Iron & Steel Company have been incorporated to take over the business of Igoe Bros., manufacturers of wire and wire nails. The company have built a new plant in Newark, N. J., but still continue in operation their plant at 226 North Ninth street, Brooklyn.

Thomas Furnace of the Carnegie Steel Company, at Niles, Ohio, has been blown out. No. 4 stack of the Carnegie Steel Company, at the Ohio Works, Youngstown, Ohio, is almost completed and is expected to be ready for blast about June 15.

It is stated that the plant of the Algoma Steel Company, Sault Ste. Marie, Ontario, will start this month turning out rails. It will be the first of the Consolidated Lake Superior plants to resume.

The Iroquois Furnace, at South Chicago, Ill., has closed down as a result of a tie up of the boats of the Lake Carriers' Association.

On an execution for $122,875 issued by the Fidelity Trust Company, Philadelphia, against the Chickies Iron Company, the property of the company at Chickies, near Lancaster, Pa., including a blast furnace, saw mill and a dozen dwellings, were sold to W. U. Hensel for $5000, subject to the mortgage of $100,000.

General Machinery.

The bid of $35,000 for the property of the defunct Union Foundry & Machine Company, Catasauqua, Pa., which was put up at auction May 26, was not deemed sufficient by the receiver, and it will be offered for sale on a later date.

The M. D. Knowlton Company have been incorporated at Rochester, N. Y., and will succeed to the business of Knowlton & Beach, manufacturers of paper box machinery.

At the plant of the William B. Pollock Company, Youngstown, Ohio, builders of all kinds of steel plate construction, has been installed a modern hydraulic flanging plant of the largest size built. This additional equipment enables the company to bend and form the heaviest sections of structural material, as well as flange, and bend plates up to 2½ inches thick. With this latest acquisition the William B. Pollock Company's plant is all the more thoroughly equipped for the erection of heavy steel plate construction work for all purposes.

The Standard Engineering Company, Ellwood City, Pa., report a large number of inquiries for pipe cutting machines, and have entered some very satisfactory orders for these. They are manufacturers of power rotary cutters, pipe bending machines, hand stocks and dies and pipe couplings for gas lines, and will be pleased to send circulars to the trade relating to these goods upon application.

The United Engineering & Foundry Company, Farmers Bank Building, Pittsburgh, have received contracts from the Reliance Tube Company for tube making machinery, to be placed in their new boiler tube plant, to be built near Avenue, Pa.

The machinery of the Woodward & Rogers Company, Hartford, Conn., has been sold to the National Machine Company of that city, manufacturers of textile machinery. It is understood that the price paid was $11,500.

The firm of Marvin & Casler, Canastota, N. Y., manufacturers of special machinery, have incorporated as the Marvin & Casler Company with a capital stock of $50,000. The company have recently enlarged their plant, installed a large amount of new machinery, and have much better facilities. It is their intention to take up a more general line of manufacturing than they have heretofore attempted. The officers are: H. N. Marvin, president; H. Casler, treasurer, and L. R. Cooper, secretary and manager.

The Barberton City Water Works, Barberton, about 5 miles distant from Akron, Ohio, has placed an order with the Pneumatic Engineering Company, through the Pittsburgh office of the Rand Drill Company, for a complete air lift plant for their new group of 12 wells. It is proposed to locate the air compressor in the new pumping station, about 1500 feet from the wells, and carry the air through a 5-inch main with branches to the several wells. The compressor is to be a Rand compound condensing type 10, having steam cylinders 10 x 18 x 14 inches and duplex air cylinders 14 x 14 inches. The equipment includes a surface condenser, air receiver, and the usual piping and specials to make up a pumping plant under this system. The capacity will be 3,000,000 gallons of water per day. It is expected to have the entire plant in running order by the middle of August.

It is not yet known just what new machinery will be required by the American Ship Windlass Company, Providence, R. I. The company are to rebuild the part of their plant which was recently destroyed by fire. A large number of the machines were saved and they now have them in operation in an unburned part of the works.

Edwin Harrington, Son & Co., Philadelphia, Pa., builders of machine tools, are to build an addition to their shop, 20 x 100 feet, which is to be used as a blacksmith shop. Power will be supplied from the present plant.

The American Ball Company, Providence, R. I., manufacturers of steel balls and ball bearings for all purposes, have increased their capital stock from $50,000 to $250,000. The additional capital will be used to provide more facilities for their business, which they announce has outgrown their present capacity.

The superintendents and other officials of the various departments of the Mesta Machine Company, Pittsburgh, held their regular monthly meeting at the Hotel Henry in that city last week. Reports relative to the operation of the various departments were read and a general discussion was had as to the outlook for rolling mill machinery and engines, such as are built by this company. The meeting was followed by a dinner, after which a number of addresses were made.

The Dix Foundry & Machine Company have been organized by Charles B. Dix and Clarence Fancher, to operate the plant of the J. L. Dix Foundry Company, Glens Falls, N. Y., which was established about 60 years ago by J. L. Dix. The plant occupies a 2-acre site and consists of a machine shop, 60 x 140 feet; foundry, 40 x 80 feet, and several smaller buildings. The equipment is modern, the machines being electrically driven, and to furnish better shipping facilities a spur is being run from the Delaware & Hudson Railroad. Besides the regular line of saw mill, grist mill, power transmission machinery and special machines, the new company will take up the manufacture of paper and pulp mill machinery.

The Lumley-Dodson Company, Norfolk, Va., have purchased the property and business of E. J. Griffith & Co. of that city and will continue the mill, steamboat and railroad supply business and a general machinery construction and repair business with increased facilities. The officers are: G. Frank Beach, president; R. A. Dodson, vice-president; E. J. Griffith, secretary; H. C. Dodson, treasurer, and W. F. Lumley, general manager.

The American Compound Bearing Company, New York, have increased their capital stock from $125,000 to $5,000,000, for the purpose of extending the business. The bearings at present are made at the plants of the Pope Mfg. Company.

The Gillette Roller Bearing Company, Grand Rapids, Mich., expect to begin the erection of a new factory building, 40 x 80 feet, two stories, within the next two weeks. No new machinery will be required.

The Hoosier Drill Company, Richmond, Ind., a branch of the American Seeding Machine Company, and the second largest plant in the combine, have closed a very successful year, having worked a full force full time. June and July are the dull months, but the plant will be continued in operation.

The Norcross Molding Machine Company have been incorporated at Terre Haute, Ind., with $10,000 capital, by Lewis J. Cox, William C. Norcross and Harry J. Baker.

The Indiana Foundry & Machine Company, South Bend, Ind., have increased their capital stock from $10,000 to $25,000.

Power Plant Equipment.

James Bonar & Co., Incorporated, Pittsburgh, are equipping the engines of the Donora furnaces of the Carnegie Steel Company, at Donora, Pa., with the Bonar gravity automatic oiling system. This contract comprises the equipping of five vertical cross compound steeple type condensing blowing engines, the three horizontal cross compound condensing engines in the power plant, and the two vertical pumping engines in the pump house.

The Free Piston Gas Engine Company, Detroit, Mich., have incorporated with a capital stock of $125,000, for the manufacture of a patented gas engine. They are at present engaged in developing the engine and have under construction a 100 horse-power engine. They are not now considering the question of a plant. Address George Maitland, who with Henry C. Hart, Charles F. Burton and Elliott J. Stoddard are the incorporators.

Wallace C. Johnson, consulting engineer of the Niagara Falls Hydraulic Power & Mfg. Company, has been engaged by the Sientere Viva Mining Company, Bluefields, Nicaragua, to prepare plans and specifications and to construct and equip an extensive electrical power development and transmission system in the locality of Bluefields.

The Wallace Barnes Company, Bristol, Conn., are building a new power house 40 x 60 feet. In it will be installed a 150 horse-power Cooper-Corliss engine which will operate a 150-kw. General Electric generator. Two 100 horse-power Dillon boilers will furnish steam power.

The Pacific Iron Works, Bridgeport, Conn., manufacturers of engines, boilers, &c., have voted to decrease their capital stock from $200,000 to $100,000.

The New Britain Machine Company, New Britain, Conn., have equipped the United States ship "Vidette," on the great lakes, with a 4½-kw. Crocker-Wheeler dynamo direct connected to a No. 4 Case engine for general illuminating and searchlight service.

A 50 horse-power engine and boiler are required by G. & W. Kolb, Philadelphia, Pa., who are to erect a two-story factory, 37 x 195 feet, with a wing 50 x 75 feet, for the manufacture of stove linings.

The Exeter Machine Company, Pittston, Pa., have just turned out the largest engine ever built at the works. It weighs 150 tons and is to be used by the Susquehanna Coal Company at Williamstown, Pa.

The firm of Howard & Roberts, boilermakers, Buffalo, N. Y., have been succeeded by Howard Bros.

Foundries.

The Keystone Foundry, at Uniontown, Pa., has been sold to the McConnell Wheel & Mine Supply Company, an organization which has a capital stock of $100,000. A new brick foundry building, 68 x 272 feet, is to be built at once.

The Malleable Iron Works, New Britain, Conn., are erecting a new brick cupola building 25 feet square and two stories high.

F. D. Beaupre & Co., East Concord, N. H., are putting up a new foundry building to replace their old building, which is no longer adequate to the needs of their business. The new foundry will be 30 x 80 feet. The firm manufacture all kinds of brass, aluminum and composition metal castings, and do brass finishing and machine work.

The Wheeling Mold & Foundry Company, Wheeling, W. Va., who have received a contract for between 30,000 and 35,000 tons of castings for the Pennsylvania Railroad tunnel, are making some enlargements to their plant in order to take care of this large work. The main foundry building is being extended 40 feet and a 60-foot lean-to is being added. A narrow gauge track is also being laid to facilitate the handling of iron and coke.

The Southern Iron Works, Chattanooga, Tenn., whose plant was recently destroyed by fire, have purchased a site in Alton Park, where they are erecting a new plant with a floor space of 18,000 square feet. The plant will be double the size of the old one and will be equipped throughout with modern machinery, which has not as yet been purchased. Since reorganization the company have taken up the manufacture of hardware cast iron specialties in connection with their regular foundry business.

The Chattanooga Roofing & Foundry Company, Chattanooga, Tenn., have added another large and well equipped brick addition to their works in which they have installed their wrought iron department. This places them in the best condition not only for furnishing sheet iron and cast iron building material, but also wrought iron work, such as stair ways, fire escapes, railings, &c. The company are now furnishing a $40,000 contract for cast iron, wrought iron and galvanized work for the Government army post buildings at Chickamauga Park and Fort McPherson. Recent contracts taken include Masonic Opera House, Williamson, N. C.; Massey Building, Birmingham, Ala.; Stockton-Budd Building and Stevenson Building, Jacksonville, Fla.; City Bank and Trust Building, Mobile, Ala.; new High School building, Chattanooga, Tenn.; Presbyterian Church, Greenwood, Miss., and the Synagogue, Natchez, Miss. The company will soon have ready for distribution a large illustrated

catalogue of their complete line, including steel roofing, steel awnings, patent metal shingles, drip pans, air tight heaters, stove pipes and elbows, eave trough, conductor pipe, tin valley roof flanges, pots, kettles, &c.

Bridges and Buildings.

The section of structural steel for the lower end of the Wabash Railroad train shed, between Second and First avenues, Pittsburgh, has arrived and the Pennsylvania Steel Company are putting it into position. The bidding on the construction of the Southside elevated tracks for this road has been confined to three construction companies—the Riter-Conley Mfg. Company, the McClintic-Marshall Construction Company and the American Bridge Company. One of the peculiar features of the construction work is the number of different corporations that have been engaged on the single contract. The main passenger station building was constructed by the George A. Fuller Company, and the first section of the elevated train shed structure was put together by the Pittsburgh Construction Company. This section carried the work to second avenue, and the Pennsylvania Steel Company will complete the structure to the bridge. The American Bridge Company constructed the bridge itself, making four construction companies engaged in the space of five city squares. The cause of this, it is said, was the almost countless strikes and interruptions to the work during the first contract.

Fires.

The John Baizley Iron Works, Philadelphia, Pa., were recently damaged to the extent of $15,000 by fire.

The factory of the Manhattan Piano Case Company, Creskell, N. J., was recently destroyed by fire, causing a loss of $60,000.

The factory of the Wolthausen Hat Corporation, at Norwalk, Conn., was destroyed by fire last week. Besides the Wolthausen Company the building was occupied by the Norwalk Hat Company and the Espenscheid Hat Company. The loss will foot over $50,000.

Hardware.

The Union Cutlery & Hardware Company, Unionville, Conn., have recently bought the cutlery department of the Upson Nut Company, and have incorporated under the above style. The company are prepared to offer to the trade nickel knives, forks, nut cracks and nut picks, also tin plated knives, forks, tea and table spoons and child's sets, all in plain and fancy patterns. They are also ready to figure on hardware specialties. H. C. Hart, for 26 years identified with the cutlery shop acquired by the new concern, is president of the company, and will have general oversight of its affairs. F. E. Taber of Springfield, Mass., takes charge of the manufacturing end of the business, and J. J. Ramage of Holyoke, Mass., of the office end. The company are starting off with good prospects, the shop running to its capacity on orders.

Western Knife Mfg. Company, Kansas City, Mo., have recently incorporated with a capital of $20,000, fully paid. R. M. Clark is president; M. B. Freshman, vice-president and manager; A. M. Clark, secretary and treasurer. The company are manufacturers of knives and forks, of which their capacity has been 40 gross daily.

The Ledoux Carriage Company, Limited, Montreal, Can., manufacturers of carriages, sleighs and automobiles, whose plant was recently destroyed by fire, are rebuilding on the same site. The new structure will be practically the same as the one which was destroyed, only that it will not be so high.

The Keyless Lock Company, Indianapolis, Ind., have secured from the United States Treasury Department the contract for bag racks for the next fiscal year. The contract amounts to $20,000.

H. B. Prentice has been elected president of the Chicago Hardware Company, Chicago, to succeed John R. Hogan, deceased. Mr. Prentice reports that the company are pushing their business with increased vigor and are extending their trade not only to all parts of this country but are also getting satisfactory orders from Canada.

The Andrew Fyrberg Company, Hopkinton, Mass., are to erect a two-story addition, 24 x 28 feet, to provide increased office accommodations and store room.

The ignition of a pot of lacquer at the shops of the Eagle Lock Company, Terryville, Conn., caused a damage of several thousand dollars on May 26.

The plant formerly occupied by the Birmingham Brass Company, Shelton, Conn., has been purchased by the Dairy Machinery & Construction Company, who have been doing business at Rome, N. Y. The new plant will give them considerably increased manufacturing facilities. They will make dairy machinery. The company's New York office is at 121 East Twenty-third street.

The Atwood Machine Company, Stonington, Conn., are building a one-story addition, 25 x 40 feet, to their casting room.

The Brainard & Wilson Company, Danbury, Conn., are to erect a three-story brick building, 30 x 40 feet, to contain their casting, buffing and plating departments. The company manufacture silver novelties.

The Elm City Brass & Rivet Company, Plainville, Conn., have begun to manufacture at the Clark & Cowles factory, which they have enlarged by the erection of a new foundry 40 feet square, and a one-story factory building 50 x 120 feet, both of brick. They will manufacture the rivet lines in copper, brass and iron formerly made by Clark & Cowles, and the fireplace fixtures formerly manufactured by the Elm City Brass Company, New Haven, Conn., which company was absorbed by the Elm City Brass & Rivet Company. Later on they expect to add new lines. The officers of the corporation are: President, T. W. Corbett; secretary, John B. Minor, and treasurer and manager, A. H. Condell. The New Haven plant has been abandoned.

Miscellaneous.

The McCaskey Register Company, Alliance, Ohio, manufacturers of McCaskey's account register and continuous duplicating system, have recently increased their capital stock from $30,000 to $100,000, and have put up an adjacent two-story brick building, 40 x 100 feet. This company were incorporated less than a year ago and have been shipping registers only about eight months, but the demand for them is so great that a large addition to their capacity for turning these out was imperative.

At Pittsburgh, in the equity proceedings instituted by C. G. Hussey & Co., Follansbee Brothers Company and others against the Pittsburgh Cornice & Skylight Company, the courts have appointed the Guarantee Title & Trust Company receivers for the company. The defendant company consented to the appointment of a receiver.

The New London Motor Company, New London, Conn., have incorporated under Connecticut laws and have established works where they will build and install marine motors and do marine and automobile repairing. Later they plan to build automobile and stationary engines. The officers of the company are: President, Fred. S. English; secretary and treasurer, John C. Geary, and superintendent, W. J. Welsh.

The American Graphophone Company, Bridgeport, Conn., are planning to erect a factory at London, England. The company will increase their capital stock from $3,000,000 to $5,000,000, the funds derived from the new stock to be devoted, in part, to improvements, which include the English factory. It is understood that the London factory will be devoted to the manufacture of records, and not the machines themselves.

Overhead track and cars for receiving bulk freight from vessels and delivering it in warehouse are required by the E. O. Painter Fertilizer Company, Jacksonville, Fla. The company have increased their capital stock from $100,000 to $250,000 and are building a new plant. The machinery has been arranged for.

The Hussey Mower Company, Knightstown, Ind., have recently completed the erection of a fully equipped plant for the manufacture of mowing machines and other agricultural implements. The buildings are located on a 12-acre site and are three in number, each being 50 x 200 feet. Power is furnished by a New Era gas engine, and the foundry is equipped with iron cupola, malleable oven furnace and brass furnace.

The Davis Calyx Drill Company, New York, have just opened an office in the Johnston Building, Cincinnati, Ohio, in charge of John F. Munn. Drills sold in West Virginia and Tennessee have proved very successful in penetrating the conglomerate of those States. Drilling is being done on property of the Plumb Orchard Land Company, on Paint Creek, Fayette County, W. Va., and at Pack Branch, nearby, for the same company; also at Herbert, Bledsoe County, Tenn., for the Estate of Jos. J. Kittel.

The American Automatic Fire Curtain Company, Buffalo, N. Y., have been incorporated with $100,000 capital stock. The directors are C. F. Adams and Charles Diebold of Buffalo and G. W. Walters of Bowmanville, N. Y.

It is stated that the Kirkham Motor Works will move their plant from Taggarts to Bath, N. Y., and erect a new factory at the latter place.

E. R. Thomas, president of the E. R. Thomas Motor Company, Buffalo, N. Y., has purchased the plant of the Conrad Motor Carriage Company of that city, at a trustees' sale.

Arrangements have just been completed whereby the business of C. H. Bidwell, Batavia, N. Y., manufacturer of threshers, which was started 21 years ago, will hereafter be carried on under the name of the C. H. Bidwell Thresher Company. The capital stock of the new company is $250,000, of which Mr. Bidwell retains $165,000. The directors are Charles H. Bidwell, Hawley N. Bidwell, George Wiard, Mrs. Adelaide R. Kenney and Dorr C. Mylecraine.

The Victor Talking Machine Company, Camden, N. J., have started to rebuild their shops, which were recently destroyed by fire, and expect to have them completed by July 15. They have just purchased a plot of ground, upon which they will erect a storage and shipping warehouse.

The plant of the Hooks Smelting Company, Philadelphia, Pa., was sold by the sheriff to William Cempini for $70,000.

The Lea Mfg. Company, Elwood, Ind., makers of electrical supplies, resumed operations Monday, after an idleness of six months.

The Ansted Axle Company, Connersville, Ind., are now at work again in new fire proof buildings, which take the place of the plant burned three months ago with $50,000 loss.

The Iron and Metal Trades

From the statistical returns it looks as though the consumption of Pig Iron had declined very materially since March, while expanding production has not been checked until the last month. Our monthly report shows that the output for May was 1,533,500 tons of Anthracite and Coke Pig Iron, as compared with 1,554,000 tons in April. But the rate of output, which had reached 366,000 tons per week on May 1, has dropped back to 336,000 tons on June 1.

The corrective was therefore quickly and automatically applied, but in the meantime stocks which were declining steadily during the first quarter of the year have been sharply increased during May, there having been an accumulation of 100,000 tons during that month alone. Two-thirds of this addition to the stock must be credited to the Central West and to the Northwest.

This indicates quite a shrinkage in the demand, which even the cutting down in the rate of production may not counterbalance. It must be noted, however, that already there has been a further restriction in the output by the blowing out of additional furnaces since the opening of the month.

A clearer view of the situation is obtained when we segregate from the totals the figures which relate to the furnaces owned and operated by the Steel companies, which last month made 972,534 tons out of a total of 1,533,530 tons. In thus reaching the product of the merchant furnaces we need only take into account the changes in the stock on hand to obtain a pretty fair estimate of the monthly consumption of Merchant Iron. This shows the following figures:

Consumption of Merchant Pig Iron.

	Gross tons.
January	441,254
February	596,076
March	626,967
April	591,314
May	459,163

These figures, of course, exaggerate the fluctuations, because they take no account of the changes in the amount of Iron carried by consumers and in transit. Still, the showing is a distinctly unfavorable one, and goes far toward explaining the attitude of both buyers and sellers during the past few weeks.

It is not surprising that the Pig Iron markets have weakened further, and Birmingham is now on the basis of $9 for No. 2 Foundry, with one transaction involving 12,000 tons closed this week. It is interesting to note that some export business in Southern Basic Pig has been done lately.

Valley furnaces are barely getting $12 for No. 2 Foundry and Bessemer Pig, and one exceptionally low sale of Low Phosphorus Pig Iron has been made in Eastern Pennsylvania.

Pool prices on Steel Billets are more and more out of line with present conditions, compared with those prevailing when the schedule was adopted.

The demand is still light in the heavier branches of the finished trade. Some fairly large orders for steel cars have brought some very welcome tonnage to the Plate Mills, who are eager for work and treat pool prices accordingly. In the Structural trade some of the long delayed Baltimore business has been coming in, so that the expectations of large orders from that quarter are revived. The Bar trade is very disappointing, and cutting is going on, notably in the West.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.

	June8, 1904.	June1, 1904.	May11, 1904.	June10, 1903.
PIG IRON:				
Foundry Pig No. 2, Standard, Philadelphia	*$14.50*	$14.50	$15.00	$19.50
Foundry Pig No. 2, Southern, Cincinnati	*11.75*	12.00	12.50	18.25
Foundry Pig No. 2, Local, Chicago	*13.50*	13.50	13.75	20.00
Bessemer Pig, Pittsburgh	*12.85*	13.35	13.60	19.85
Gray Forge, Pittsburgh	*12.35*	12.35	12.75	19.00
Lake Superior Charcoal, Chicago	15.00	15.00	15.00	24.00
BILLETS, RAILS, &c.:				
Steel Billets, Pittsburgh	23.00	23.00	23.00	29.00
Steel Billets, Philadelphia	24.00	24.00	24.25	31.00
Steel Billets, Chicago	24.00	24.00	24.00	31.50
Wire Rods, Pittsburgh	*29.50*	30.00	30.50	37.00
Steel Rails, Heavy, Eastern Mill	28.00	28.00	28.00	28.00
OLD MATERIAL:				
O. Steel Rails, Chicago	*9.50*	11.00	11.00	17.00
O. Steel Rails, Philadelphia	*11.25*	12.00	12.60	21.00
O. Iron Rails, Chicago	*14.50*	15.25	16.50	22.50
O. Iron Rails, Philadelphia	*14.50*	15.00	17.00	24.00
O. Car Wheels, Chicago	*11.50*	12.50	13.00	22.00
O. Car Wheels, Philadelphia	12.00	12.00	12.00	22.50
Heavy Steel Scrap, Pittsburgh	*11.50*	11.50	12.00	....
Heavy Steel Scrap, Chicago	*9.50*	9.50	10.00	16.50
FINISHED IRON AND STEEL:				
Refined Iron Bars, Philadelphia	1.48½	1.48½	1.48½	1.85
Common Iron Bars, Chicago	*1.30*	1.35	1.45	1.75
Common Iron Bars, Pittsburgh	1.35	1.35	1.35	1.80
Steel Bars, Tidewater	1.49½	1.49½	1.49½	1.75
Steel Bars, Pittsburgh	1.35	1.35	1.35	1.60
Tank Plates, Tidewater	1.74½	1.74½	1.74½	1.80
Tank Plates, Pittsburgh	1.60	1.60	1.60	1.60
Beams, Tidewater	1.74½	1.74½	1.74½	1.73½
Beams, Pittsburgh	1.60	1.60	1.60	1.60
Angles, Tidewater	1.74½	1.74½	1.74½	1.73½
Angles, Pittsburgh	1.60	1.60	1.60	1.60
Skelp, Grooved Steel, Pittsburgh	**1.40**	1.40	1.35	1.90
Skelp, Sheared Steel, Pittsburgh	**1.40**	1.40	1.35	2.00
Sheets, No. 27, Pittsburgh	*2.05*	2.10	2.10	2.65
Barb Wire, f.o.b. Pittsburgh	2.50	2.50	2.50	2.60
Wire Nails, f.o.b. Pittsburgh	1.90	1.90	1.90	2.00
Cut Nails, f.o.b. Pittsburgh	1.75	1.75	1.75	2.15
METALS:				
Copper, New York	*12.75*	13.00	13.37½	14.75
Spelter, St. Louis	*4.60*	4.65	5.00	5.50
Lead, New York	*4.25*	4.25	4.50	4.37½
Lead, St. Louis	*4.12½*	4.17½	4.35	4.15
Tin, New York	*26.70*	26.80	27.60	28.50
Antimony, Hallett, New York	7.25	7.00	7.25	7.00
Nickel, New York	40.00	40.00	40.00	40.00
Tin Plate, Domestic, Bessemer, 100 pounds, New York	3.64	3.64	3.64	3.99

Chicago.

FISHER BUILDING, June 8, 1904.—(*By Telegraph.*)

This is a waiting market. Prices on all commodities not controlled by iron clad associations have sagged to a point where further decreases are practically impossible, and they must either remain stationary at these low figures or advance. On Billets, Bars and Plates, where prices have been held regardless of the law of supply and demand, new factors have introduced themselves into the market, which tends to make the buyer, in a measure, independent of the associations. While the new factors have only a limited tonnage to sell, it is sufficient at the present state of the market to overcome the power of the organizations which have remained in undisputed command up to the present time. Southern Pig Iron might be quoted on the basis of $9, Birmingham, with considerable truth. It may also be quoted on the basis of $9.25, Birmingham, with truth, but the percentage of sales that are being made on the $9 basis is so small as compared with the percentage at $9.25 or above that we are no more warranted in quoting the $9 price to-day than we were in our issue of November 26, when an almost similar condition of affairs was present. Iron consumers in the West and Northwest who have the advantage of the recent cut in freight rates amounting to 25c. per ton have now an opportunity of buying Southern Iron at a lower delivered price than has been offered for a number of years, beating by 20c. to 40c. the lowest price obtainable during the slump last November. Northern Irons are quoted nominally at $13.50 to $14, with business extremely light, and furnaces loath to take business at lower than these figures. The vesselmen's strike has some influence on the market, as it has already closed down one of the Iroquois furnaces, and will shortly close the other. Billets are in light demand, with

pool prices nominally prevailing except on such sizes as are offered by a leading independent at a reduction. A slight awakening in activity on Standard Section Rails is noted, but it is barely a ripple on the calm surface. Light Sections are in slow demand, while Spikes and Splices have been in rather better demand than for some time as a consequence of lower prices. Structural Materials are somewhat more active than they were a week ago, but the demand except in the immediate vicinity of Chicago is unsatisfactory. Business in Plates is quiet, the leading Western mill having barely sufficient tonnage to keep its rolls in operation. Sheets are more active than Plates, but still far from satisfactory, with a tendency to slash prices where necessary to secure large tonnage. The Bar market is rather difficult to diagnose, owing to the fact that a large independent producer who in some seasons of the year is a greater buyer than a seller is offering Steel Bars at whatever reduction is necessary to take desired contracts. Iron Bars have also suffered at the hands of the inexorable law of supply and demand, being quoted at from 1.30c. to 1.40c., according to local conditions. Merchant Steel is seasonably quiet. Reductions in Steel Pipe noted last week have not resulted in the desired increase of business. Boiler Tubes continue to be weak. Some Old Materials have advanced, and others receded from last week's quotations, leaving the general average about the same. The Coke situation is brightening a little, owing to the fact that demurrage Coke on track in Chicago is rapidly disappearing.

Pig Iron.—The Iron market seems to be just where it was the last week of November and the first week of December, when it was a matter of doubt whether it should be quoted at $9 or $9.25, Birmingham, for No. 2. At that time we took the stand that the transactions booked at $9 were not of sufficient magnitude to warrant us in naming that price, and we quoted $9.25 as the current market price for No. 2 Iron at Birmingham. As far as the Chicago markets are concerned we will repeat this line of reasoning for the present week's quotations and make no change from last week's quotations, naming $9.25 to $9.50, Birmingham, as the current market for No. 2 Iron sold by fracture, but indicating clearly that business has been done and is being done on a lower basis than that, particularly where analysis Iron is called for that may be so manipulated by the furnaces as to be handled at lower than the No. 2 price without outraging the feelings of competing furnaces and still satisfying the customer that No. 2 is being delivered. When one takes into consideration the fact that the freight rate from the Birmingham district is 20c. lower than it was last year to Chicago and other points in this district, it becomes evident that foundries are now able to stock up with Pig Iron at a price lower than they have had offered to them for a number of years. It would seem the part of wisdom on the part of foundries to take advantage of this low price during the existence of the present low freight rate, which is supposed to expire July 1, particularly as the Southern furnaces indicate that as soon as the $9 price is reached squarely they will give the preference to export shipment, which they claim to be available at that price from foreign buyers. Northern Irons are quoted nominally at $13.50 to $14, Chicago, for No. 2, which means from $13 to $13.50 at the furnace, according to freight distance. A number of furnaces have definitely set $13.50 as their limit, below which they will not sell, preferring rather to go out of blast. One Iroquois furnace was closed down last week for lack of Ore owing to the lake carriers' strike, and it is only a question of time until the other furnaces will be compelled to bank or go out of blast for the same reason. It is pretty generally felt here that whenever the United States Steel Corporation and other large Ore interests desire the lake strike to be ended it will end on a very few hours' notice. In other words, that the large Ore interests are fostering the demands of the strikers with a view to shutting out competition. The fact that all the furnaces of the leading interest are well equipped with Ore, the tonnage being sufficient to last until snow flies, would lend color to this belief. Prices, while considerably unsettled, are not sufficiently so to warrant us in making a single change as compared with last week's figures, which we repeat, as follows:

Lake Superior Charcoal	$15.00 to $15.50
Northern Coke Foundry, No. 1	14.00 to 14.50
Northern Coke Foundry, No. 2	13.50 to 13.75
Northern Coke Foundry, No. 3	12.75 to 13.00
Northern Scotch, No. 1	.... to 14.25
Ohio Strong Softeners, No. 1	15.30 to 15.50
Ohio Strong Softeners, No. 2	14.80 to 15.05
Southern Silvery, according to Silicon	14.65 to 15.65
Southern Coke, No. 1	13.15 to 13.40
Southern Coke, No. 2	12.90 to 13.15
Southern Coke, No. 3	12.40 to 12.65
Southern Coke, No. 4	12.15 to 12.40
Southern Coke, No. 1 Soft	13.15 to 13.40
Southern Coke, No. 2 Soft	12.90 to 13.15
Southern Gray Forge	12.15 to 12.40
Southern Mottled and White	11.90 to 12.15
Malleable Bessemer	14.00 to 14.25
Standard Bessemer	15.30 to 15.80
Jackson County and Kentucky Silvery, 6 to 10 per cent. Silicon	16.30 to 18.30
Alabama Basic	13.15 to 13.40
Virginia Basic	14.40 to 14.65

Billets.—Billets are still being offered by an outside producer at whatever reduction below pool prices is necessary to move them, but this is not so much for immediate shipment as for contracts in the future, the purpose of the producer being to take sufficient contracts to keep the plant running full force, even though some of the surplus above their own needs must be sold at a considerable reduction. Pool prices are unchanged, as follows: Forging Billets, 4 x 4 and larger, $24 per gross ton, Chicago, in carload lots; Axle Billets and Billets smaller than 4 x 4, $25.

Rails and Track Supplies.—In both Standard and Light Sections the Rail business is quiet, as far as new business is concerned, although roads have specified with comparative liberality against old contracts, sufficiently so at least to keep the mills running in good shape. Prices are unchanged on the basis of $28 per gross ton for Standard Sections in 500-ton lots and greater and from $23 to $26 per ton for Light Section Rails. Angle Bars are lower in price, being now quoted at 1.35c. to 1.45c.; Spikes are unchanged at 1.65c. to 1.75c, base, while Track Bolts have suffered another reduction until they are now quotable at 2.20c. to 2.30c., base, with Square Nuts, and 15c. extra for Hexagon Nuts.

Structural Material.—While no large contracts have been placed within the last week, the tonnage of pick up orders is rather better than it has been for several weeks, and producers are correspondingly encouraged. Prices, of course, are unchanged from mill and have suffered no change from store, as follows: I-Beams and Channels up to and including 15 inches and Angles 3 inches on one leg and larger, 1.76½c., Chicago; Tees, $1 per ton extra. Store prices on Structurals are as follows: Angles, Beams, Channels and Zees, base sizes, 2c. to 2.10c.; Tees, 2.05c. to 2.15c., either random lengths or cut to lengths 5 feet and over.

Plates.—There is just about enough business in Plates from week to week to keep the mill of the leading Western producer running. At the same time a number of Western interests represented in this market are taking a considerable tonnage of Plates, presumably at association prices. An Ohio River interest is quoting Plates 60 inches wide and narrower at a reduction of $1 to $2 below association prices, and is booking some business on that basis, but, taken altogether, the Plate business is extremely slow, with but little promise for improvement in the next two or three months. Association prices remain unchanged, as follows: Tank Steel, ¼-inch and heavier, 1.76½c.; Flange Steel, 1.86½c.; Marine, 1.96½c.; Universal Mill Plate, 1.76½c. to 1.81½c.; 3-16 Tank, 1.86½c.; Nos. 7 and 8, 1.91½c. to 2.01½c.; No. 12, 2.01½c. to 2.06½c. Store prices are as follows: Tank Plate, 100 inches wide or less, ¼-inch and heavier, 2c. to 2.10c.; 3-16 inch, 2.10c. to 2.15c.; Nos. 8 and 10, 2.10c. to 2.20c.; Flange quality, 25c. per 100 lbs. extra.

Sheets.—In the midst of warring interests, each of which is quoting a price that is deemed sufficient to take competitive business, the prices named below are [illegible] representations of the car lot price, f.o.b. Chicago, on Blue Annealed and Box Annealed Sheets in the sizes named. Large buyers are occasionally able to do better on desirable specifications and less than car lot buyers have to pay more as a rule. These prices are as follows: One Pass Cold Rolled Blue Annealed, Nos. 9 and 10, 1.76½c.; Nos. 11 and 12, 1.86½c.: Nos. 13 and 14, 1.91½c.; Nos. 15 and 16, 2.01½c.; One Pass Cold Rolled Box Annealed, Nos. 18 and 20, 2.11½c.; Nos. 22 and 24, 2.16½c.; Nos. 25 and 26, 2.21½c.; No. 27, 2.26½c.; No. 28, 2.36½c.; No. 29, 2.51½c.; No. 30, 2.61½c. We revise prices of Sheets from store as follows: No. 8, 2.10c. to 2.20c.; No. 10, 2.15c. to 2.25c.; No. 12, 2.20c. to 2.30c.; No. 14, 2.25c. to 2.35c.; No. 16, 2.30c. to 2.40c.; Nos. 18 and 20, 2.40c. to 2.45c.; No. 22, 2.45c. to 2.50c.; No. 24, 2.50c. to 2.55c.; No. 26, 2.60c.; No. 27, 2.70c; No. 28, 2.80c.; No. 29, 2.95c.; No. 30, 3.10c. Galvanized Sheets are selling from stock at 75 and 10 per cent. discount, Chicago, for 16 gauge and heavier, and about 75, 10 and 5 for lighter gauges, while mill prices, f.o.b. Pittsburgh, in carload lots, range from 80 and 5 to 80 and 10 per cent.

Bars.—All the leading producers of Bar Iron in the West give their official quotation for purposes of publication at from 1.35c. to 1.40c., base, half extras, carload lots, Chicago. But there is a strong undercurrent in the market that insists that 1.25c. to 1.30c. is more nearly the actual price paid by large consumers on contracts for desirable sizes, and that at even these low prices extras are frequently waived. The daily papers throughout the country are publishing articles that profess to state authoritatively that the Republic Iron & Steel Company sold 8000 tons to a Western car builder at 1.20c., flat, no extras, but this statement is strenuously denied by the Republic Iron & Steel Company, and, after a careful survey of attendant conditions, is rejected by the writer as unlikely. At the same time it must be understood that the character and size of the order and the terms of payment therefor have great influence upon the price that may be obtainable, and that it might not be entirely impossible to secure Bar Iron at 1.25c., Chicago, provided all conditions were favorable to the naming of the bottom price on the part of the producers. Steel Bars and Bands are still held at the 1.35c. basis, Pittsburgh, which means 1.51½c.,

half extras, Chicago, in carload lots, as far as the mills are concerned who are in the Bar Association, but there are interests outside of this association who are not slow to name prices more favorable by $1 or $2 per ton in cases where specifications are considered desirable. Hoops remain unchanged at 1.56½c. rate, full extras, Chicago, carload lots. Store prices are unchanged, as follows: Iron Bars, 1.75c., base, full extras; Steel Bars, 1.70c. to 1.80c., base, half extras; Hoops, 2.10c. rates, full extras.

Merchant Steel.—The strike of the Machinists' International Union in Chicago and vicinity has unfavorably affected the Tool Steel market and business is extremely quiet. On top of this the implement manufacturers have reached a point where their requirements are merely nominal, the materials usually being drawn from stock for immediate shipment to facilitate the completion of final factory orders. There is a feeling based on crop reports from all over the Mississippi and Missouri valleys that the demand for fall implements will be very great as a result of excellent crops. Prices remain unchanged, as follows: Open Hearth Spring Steel to the general trade, 2c. to 2.25c.; Smooth Finished Machinery Steel, 1.76½c. to 1.81½c.; Smooth Finished Tire, 1.71½c. to 1.76½c.; Sleigh Shoe, flat, 1.56½c. to 1.61½c.; Sleigh Shoe, concave and convex, 1.66½c. to 1.71½c.; Cutter Shoe, 2.25c. to 2.35c.; Toe Calk Steel, 2.06½c. to 2.11½c.; Crucible Tool Steel, 6½c. to 8c.; special grades of Tool Steel, 13c. and up; Shafting at 52 per cent. in car lots and 47 per cent. in less than car lots.

Merchant Pipe.—It cannot be said that the reduction named last week brought from their hiding places any great number of orders. The Pipe mills have had five months of excellent business in 1904, and now that this business is dropping off there is a disposition of their part to make some concessions in order to keep together the organizations and shop forces which have been actively employed up to the present time. That a reduction of one point cannot do this in consideration of other Iron and Steel conditions is very apparent. Revised prices quoted this week are repeated, as follows:

	Steel Pipe.		Guar. Wr'ght Iron.	
	Black. Per cent.	Galv. Per cent.	Black. Per cent.	Galv. Per cent.
⅛ to ⅜ inch	67.35	57.35	64.35	54.35
½ inch	70.35	60.35	67.35	57.35
¾ to 6 inches	74.35	64.35	71.35	61.35
7 to 12 inches	69.35	59.35	66.35	56.35

Boiler Tubes.—Outside of Seamless Tubes, which we revise in prices, no changes are named, and business is extremely slow with but little prospect of improvement. Prices are as follows:

	Steel.	Iron.	Seamless steel.
1 to 1½ inches	43.35	40.80	52.35
1¾ to 2¼ inches	55.85	38.35	40.35
2½ inches	58.35	43.35	43.35
2¾ to 5 inches	64.35	50.85	up to 4 in. 50.85
6 to 13 inches	55.85	38.35	....

Store discounts are unchanged, as follows:

	Steel.	Iron.	Seamless steel.
1 to 1¼ inches	40	35	37½
1¾ to 2½ inches	50	32½	35
2¾ to 5 inches	60	45	45
6 inches and larger	50	32½	..

Cast Iron Pipe.—Only a moderate volume of business is being booked by either the leading producer or by independents, and it is not likely that great activity will be manifested in the buying of Pipe until the Pig Iron markets have reached a point where their tendency is upward rather than stationary or downward. Prices are unchanged, as follows: 4-inch Water Pipe, $26, and 6-inch and heavier, $25, with $1 extra for Gas Pipe.

Old Materials.—Little by little the inequalities between cognate lines of Old Materials are becoming more evened up, and the prices have reached a point where speculative buying has set in on the part of dealers who have yards to carry materials until such a time as better prices shall be realized. This speculative buying is commencing rather encouragingly, and men of long experience in the trade are of the opinion that there is scarcely an item on the list that is not good for speculative purposes at present figures. Five items on the list for this week's quotations are advanced, as follows: Mixed Country Steel, $1.50; No. 2 Railroad Wrought, 25c.; Machine Shop Turnings, 50c.; Railroad and Agricultural Malleable, 25c.; Stove Plate and Light Cast Scrap, 50c. The following reductions are noted: Old Iron Rails, 75c.; Car Wheels, $1; No. 1 Dealers' Forge, 50c.; Heavy Cast Scrap, $1.25. We quote as follows, carload lots, per gross ton, Chicago:

Old Iron Rails	$14.50 to $15.00
Old Steel Rails, 4 feet and over	11.00 to 11.50
Old Steel Rails, less than 4 feet	9.50 to 10.00
Heavy Relaying Rails, subject to inspection	23.00 to 24.00
Heavy Relaying Rails, for side tracks	18.00 to 20.00
Old Car Wheels	11.50 to 12.00
Heavy Melting Steel Scrap	9.50 to 10.00
Mixed Steel	8.50 to 9.00

The following quotations are per net ton:

Iron Fish Plates	$12.00 to $12.50
Iron Car Axles	15.00 to 15.50
Steel Car Axles	13.50 to 14.00
No. 1 Railroad Wrought	10.50 to 11.00
No. 2 Railroad Wrought	9.00 to 9.50
Shafting	12.50 to 13.00
No. 1 Dealers' Forge	8.00 to 8.50
Wrought Pipe and Flues	7.50 to 8.00
Iron Axle Turnings	7.00 to 7.50
Soft Steel Axle Turnings	7.00 to 7.50
Machine Shop Turnings	6.50 to 7.00
Cast Borings	3.00 to 3.50
Mixed Borings, &c	3.00 to 3.50
No. 1 Mill	6.00 to 6.50
Country Sheet	5.00 to 5.50
No. 1 Boilers, cut to Sheets and Rings	7.50 to 8.00
Heavy Cast Scrap	8.25 to 8.75
Stove Plate and Light Cast Scrap	7.50 to 8.00
Railroad Malleable	8.25 to 8.75
Agricultural Malleable	7.75 to 8.00

Metals.—Prices are unchanged, as follows: Pig Tin is still quoted at 29¼c. to 29⅜c. Pig Lead is now quoted at 4.30c. for 50-ton lots, with car lots at about 4.40c. and small lots at 4.60c. Spelter is now sold at from 5.05c. to 5.10c. for car lots and 5.25c. to 5.40c. for less than car lots. No change is noted in Sheet Zinc, which is quoted at 6.20c. for car lots of 600-lb. casks and 6.45c. to 6.50c. for less than car lots. Old Metals are weaker in tone and reductions have taken place in Copper and Brass. We quote: Copper Wire and Heavy, 11c. to 11⅛c.; Copper Bottoms, 9¾c.; Copper Clips, 11c.; Red Brass, 9¾c.; Red Brass Borings, 8c.; Yellow Brass, Heavy, 7½c.; Yellow Brass Borings, 6c.; Light Brass, 5⅜c.; Tea Lead, 3½c.; Zinc, 3.75c.; Pewter, No. 1, 17½c.; Block Tin Pipe, 22c.

Coke.—The great volume of Connellsville Coke on the demurrage tracks of the receiving roads is being gradually reduced and buyers are beginning to pay regular market prices for Coke, based on $2 to $2.25 at the ovens for 72-hour Foundry quality and about 75c. less for Furnace quality. To the oven price must be added $2.65 from the Connellsville, New River and Pocahontas regions and $2.25 from Wise County, Va., ovens for freight costs. Nothing new seems to have developed on the proposition to reduce freights from the other regions to confirm with the 40c. cut from the Wise County ovens.

A. F. Brunck, who for a number of years has been a traveling salesman for the Crucible Steel Company of America, has withdrawn from that company and established himself in business at 1334 First National Bank Building, Chicago, as Western representative for the Vulcan Crucible Steel Company, Pittsburgh.

Philadelphia.

FORREST BUILDING, June 7, 1904.

There is little new to be said in regard to conditions in the Iron trade, except that prices are steadier than might be expected considering the extreme dullness. The tenacity of makers in regard to prices is remarkable, as they seem determined to stop production rather than sell Iron at a loss. Ruling prices may leave a small profit to some of the best situated plants, but the majority are not doing more than getting a new dollar for an old one, so that lower prices would leave a distinct loss. The expressed intention is to blow out some furnaces immediately, and others if it becomes clear that more Iron is being made than is needed. This is the only protection against a demoralized market, as it is possible to limit the supply when it is not possible to increase the demand, and this appears to be the case at the present time. There is practically no demand for anything that is not wanted immediately, from Pig Iron to the most highly finished product. This is a healthy condition, although it is not a pleasant one; but it will be a great help toward recovery when the turn is once made. If stocks are kept within proper limits the first impulse toward improvement is felt immediately, whereas if large stocks are in sight it takes a long time to convince buyers that the market is on the eve of improvement. Meanwhile, however, the only encouraging feature in sight is that the market is not likely to be overloaded. There may be, and probably will be, a good deal of adjusting in selling prices, in costs and in other ways. If costs are lowered, prices may be lowered in proportion; but the first step must be lower costs, otherwise there will be no lower prices. Until after midsummer, however, there is not much probability of change in any direction; beyond that time it will depend on what may turn up in the interim. It is doubtful if there ever was a time when the trade were so resolved to be noncommittal as they are to-day. Not that the outlook is regarded as particularly dangerous, but rather that if things are going to be better there will be no great loss by waiting, while if they should turn out unfavorably, it will be so much the better to maintain free hands. The strongest feature of these times is that manufacturers have the courage of their convictions. There was a time when this could not have been said truly, but there is little doubt that during this period of reaction manufacturers will not load themselves up with material which may stand as a barrier to improvement for weeks, if not months beyond what would be necessary if new demand had to be met by new supply. At the moment there is nothing whatever to indicate any material improvement during

the next few weeks. If nothing unforseen occurs business ought to improve some time during the third quarter of the year, but there are elements of uncertainty which will have to be removed before any great activity can be expected.

Pig Iron.—Business has been extremely dull during the past week, but nothing has transpired to affect prices. The only break has been in Low Phosphorus Pig, several thousand tons having been bought at pretty nearly $1 per ton decline. Ordinary grades, however, are steadily held at last week's prices—say $14.75 to $15 for the usual run of orders for No. 2 X Foundry and a trifle less when the lot is of importance and deliveries pretty well extended. At the moment there appears to be no probability of any material change, the influences working for a decline being pretty well offset by others of a contrary nature. It is just possible that Pig Iron may work down to $14 for No. 2 X Foundry delivered, but the chances are not strong, although it is impossible to say what may happen if the inactivity continues much longer. But it is safe to say that the general idea is that prices will be held pretty close to to-day's figures, unless something unforeseen develops within the next 30 days. The immediate outlook does not indicate any great activity, although buyers for moderately large lots could be found at about 50c. per ton below current quotations. Southern No. 2 X is said to be held at $9.25 as an inside figure, although buyers intimate that they can do better than that. The course of the market is liable to be influenced somewhat by the action of the Alabama furnaces, but for the present the following are regarded as firm quotations for Philadelphia and nearby deliveries:

No. 1 X Foundry	$15.25 to $15.50
No. 2 X Foundry	14.50 to 15.00
No. 2 Plain	14.00 to 14.25
Alabama No. 2, rail shipment	13.75 to 14.00
Alabama No. 2, on dock	12.75 to 13.00
Standard Gray Forge	13.50 to 13.75
Ordinary Gray Forge	12.75 to 13.00
Basic	13.75 to 14.00

Steel.—The demand for small lots is very good, and local mills are well employed on this class of business. There is no demand for deferred deliveries, however, so that the future is more or less clouded and uncertain. Prices $24 to $24.50, according to quantity.

Plates.—There is no change to notice in the Plate trade. The building trade are sending in a few good orders, but bridge and ship builders are not furnishing much new business at present, although the average output at mills is about the same as for several weeks past. Prices are unchanged, as follows:

	Carloads. Cents.	Part carloads. Cents.
Tank Steel, ¼-inch and heavier	1.73½	1.78½
Tank Steel, 3-16 inch	1.83½	1.88½
Tank Steel, Nos. 7 and 8, B. W. G.	1.88½	1.93½
Tank Steel, Nos. 9 and 10, B. W. G.	1.98½	2.03½
Flange or Boiler Steel	1.83½	1.88½
Commercial Fire Box Steel	1.93½	1.98½
Still Bottom Steel	2.03½	2.08½
Locomotive Fire Box Steel	2.23½	2.28½
Plates over 100 to 110 inches	.05 per lb. extra	
Plates over 110 to 115 inches	.10	"
Plates over 115 to 120 inches	.15	"
Plates over 120 to 125 inches	.25	"
Plates over 125 to 130 inches	.50	"
Plates over 130 inches	1.00	"
All sketches (excepting straight taper plates varying not more than 4 inches in width at ends, narrowest end being not less than 30 inches)	.10	"
Complete Circles	.20	"

Shell grade of Steel abandoned.

Structural Material.—A few orders have come in from the Baltimore district, and while there is no great activity, it is thought that there will be something doing later in the season. There is a good deal of business in prospect; the difficulty is to get it closed, but there is reason to believe that some portion of it will materialize in the near future. Prices are unchanged, as follows: Beams, Channels and Angles, 1.73½c. to 1.85c., according to specifications, and small Angles, 1.50c. to 1.55c.

Bars.—The demand for Bars is certainly very disappointing. Some of the mills claim that specifications cannot be had on orders taken several months ago at less than to-day's prices and that, in consequence, cancellations are being made in some cases on good sized lots. This indicates a condition of dullness which is very unusual, but for the present there is no prospect of improvement. Prices are maintained at 1.48½c. to 1.53½c. on both Refined Iron and Steel Bars, and no deviation from these figures is mentioned, which is unusual on such a dull market as we are now having.

Sheets.—The demand is inactive and prices very irregular, particularly when the tonnage is large.

Old Material.—Prices are still weak, with a drooping tendency, but it is difficult to quote exact prices when there is so little demand. Buyers talk $11.25 for No. 1 Melting Steel, with sellers at $11.75 to $12, and No. 1 Railroad Scrap at $13.50 bid, $14 to $14.50 asked. A 1000-ton lot Low Phosphorus Scrap sold at $16, delivered. The following bids and offers fairly represent buyers' and sellers' ideas for deliveries in buyers' yards:

No. 1 Steel Scrap	$11.25 to $11.75
Low Phosphorus Scrap, sales	.... to 16.00
Old Steel Axles	15.00 to 16.00
Old Iron Rails	14.50 to 15.00
Old Iron Axles	17.00 to 17.50
Old Car Wheels	12.00 to 12.50
Choice Scrap, R. R. No. 1 Wrought	13.50 to 14.50
Yard Scrap	12.50 to 13.00
Machinery Scrap	12.00 to 12.50
No. 2 Forge Fire Scrap	10.50 to 11.00
No. 2 Forge Fire Scrap (Ordinary)	9.00 to 10.00
Wrought Turnings	8.50 to 9.00
Axle Turnings, Choice Heavy	9.50 to 10.00
Cast Borings	6.50 to 6.75
Stove Plate	9.00 to 9.50
Wrought Iron Pipe	10.00 to 11.00

Cleveland.

CLEVELAND, OHIO, June 7, 1904.

Iron Ore.—Some of the furnacemen have begun to look around a little for their Ore supply, but so far nothing has been done toward covering season needs. The producers are not pushing the market any, but have tacitly agreed upon a basis of prices and are waiting. This basis is aproximately $3.25, f.o.b. lake ports for Bessemer Old Range and $3, f.o.b. lake ports for Bessemer Mesaba. Other grades are scaled according to those prices. The Civic Federation has closed its investigation into the strike of the masters and pilots. It confesses now its inability to do anything to intervene in this struggle or toward settling it. The efforts to bring about peace are therefore left to the opposing sides in the controversy. The vesselmen continue to try to break up the union, while the masters and pilots are trying to disrupt the Lake Carriers' Association.

Pig Iron.—The market becomes more and more quiet. Spot buying is lighter than usual, and there is absolutely nothing doing in buying for second half. One of the indications of weakness was the price offered a Pipe firm of Northern Ohio. It inquired for 12,000 tons of Nos. 3 and 4 Southern Foundry, and was offered the material delivered at $12.10. The price was the average between Nos. 3 and 4. The contract has not yet been closed. The freight rate being deducted, the average price is $8.25, Birmingham. In Bessemer there has not been an inquiry for second half delivery, and no sales have been reported. The market is flat. The quotation of $12.25 to $12.75 in the Valleys is continued, but it is understood to be purely nominal. The Coke market is easy but steady. Prices are unchanged. We quote Pig Iron prices, f.o.b. cars Cleveland, as follows:

Northern Coke, No. 1 Foundry	$13.75 to $14.00
Northern Coke, No. 2 Foundry	13.25 to 13.50
Northern Coke, No. 3 Foundry	12.75 to 13.00
Southern Coke, No. 1 Foundry	13.85 to 14.10
Southern Coke, No. 2 Foundry	13.35 to 13.60
Southern Coke, No 1 Soft	13.85 to 14.10
Southern Coke, No. 2 Soft	13.35 to 13.60
Jackson County, 8 per cent. Silicon	.... to 16.45
Hanging Rock Charcoal, No. 1	.... to 23.45
Southern Charcoal, No. 1	.... to 17.85
Lake Superior Charcoal	16.50 to 17.00

Finished Iron and Steel.—The Cleveland market has had a little better feeling this past week than was reported a week ago. Some of the better tone to the market may have come from the summing up of the work done during May, most of which summaries show better results than had been expected. One of the jobbers reported more tonnage sold during May this year than last. Bars and Bands exceeded the other grades as to volume, with Structural Shapes and the smaller Angles producing the second tonnage. The report that the Bar Iron mills are to close July 1 for repairs and for an indefinite period caused a little better buying in that line. As was intimated, however, when the notices were sent out, the closing of the mills will not make an appreciable difference in the amount of material which is sold before that time. The Bar Steel mills will not close for repairs, most of that work having been done at odd times. Prices hold at 1.35c., Pittsburgh, for Bar Iron and Bessemer Steel, and 1.40c., Pittsburgh, for Open Hearth Steel. The market for Hoops and Bands has eased a little, although it can hardly be said to be softening. The situation in the structural trade has been a little better, most of the demand, however, being specification against old contracts. Much of the activity in that line here has been in ship material, but the American Ship Building Company are just about to complete the last of their old contracts for ships, when all of their yards will be closed for the season. Repair work, upon which the company depend so much, is not extensive, because of the comparatively few boats which are in operation. There has been a fair specification on Rails and Track Supplies during the week, but in that respect the market has not changed materially. The Billet market is weaker than it was. Most of the sales here are being made by the small mills, which deal through the middlemen, and these have been in a large measure responsible for the cutting. With a slight improvement in the Sheet market, small mills continue their cutting of prices. The market is represented by the following: Black Sheets, out of stock, 2.50c. for No. 27, and for the same gauge in car lots, at the mill, 2.20c. to 2.25c. Galvanized Sheets are sold out of stock at 75, 10 and 5 off list for Nos. 16 to 20 and 75, 10 and 7½ off list for No. 22 and lighter.

Old Material.—The market has been much easier. Those who collect the material report that there is much more of it than the market will consume and are offering it at very low prices to the middlemen. The latter, being unable to make disposition of it at good prices, are selling the market down. We revise and quote, most prices purely nominal, all gross tons: Old Steel Rails, $12; Old Car Wheels, $12; Heavy Melting Steel, $11. All net tons: Cast Borings, $4 to $4.50; No. 1 Busheling, $10.50 to $11; No. 1 Railroad Wrought, $11.50 to $12; Wrought Turnings, $6.50 to $7; Iron Car Axles (nominal), $16 to $17; No. 1 Cast, $11; Stove Plate, $8 to $8.50.

Cincinnati.

FIFTH AND MAIN STS., June 8, 1904.—(*By Telegraph.*)

Pig Iron.—Generally speaking, the market is in practically the same condition that has characterized it for some time past. Sales that have been made have brought out a $9 figure, and regardless of the fact that several furnaces still quote on a $9.25 basis. It is very evident that there is plenty of Iron for sale on a $9, Birmingham, basis. The general foundry and jobbing business is very quiet, with most concerns of this kind running only three or four days per week. Consequently they are not using the full quota of Iron which they secured for use in the first half, and this will of itself make it unnecessary for them to purchase any more until later in the year. The Pipe interests are as busy as they can wish with orders for Pipe coming in from many sections of the country. It begins to look as if the time had about arrived when Southern furnaces will decline to make any further reductions in their figures, and it is sincerely hoped that this fact will materially aid in strengthening the market. There have been quite a number of small lots sold, but consumers generally are purchasing only in a hand to mouth fashion. While the tonnage in itself has been small, taken as a whole, it is far from inconsiderable. The largest sale recorded during the week was 12,000 tons sold to a Northern Ohio Iron and Steel concern on an analysis basis, but taking the grades equivalent to Nos. 3 and 4 Foundry. This sale was equally divided between these two grades, and is reported to have been made on a basis of $8.40 and $7.90, respectively, Birmingham. The only inquiry of any moment was one from an agricultural company, calling for 40,000 tons, with delivery running from July to April. Freight rates from Hanging Rock district to Cincinnati, $1.15, and from Birmingham, $2.75. We quote, f.o.b. Cincinnati, as follows:

Southern Coke, No. 1	$12.25 to $12.50
Southern Coke, No. 2	11.75 to 12.00
Southern Coke, No. 3	11.25 to 11.50
Southern Coke, No. 4	11.00 to 11.25
Southern Coke, No. 1 Soft	12.25 to 12.50
Southern Coke, No. 2 Soft	11.75 to 12.00
Southern Coke, Gray Forge	10.75 to 11.00
Southern Coke, Mottled	10.50 to 10.75
Ohio Silvery, No. 1	15.65 to 16.15
Lake Superior Coke, No. 1	13.15 to 13.65
Lake Superior Coke, No. 2	12.65 to 13.15
Lake Superior Coke, No. 3	12.15 to 12.65
Car Wheel and Malleable Irons.	
Standard Southern Car Wheel	$16.25 to $16.75
Lake Superior Car Wheel and Malleable	15.80 to 16.30

Coke.—The demand for Coke is light and the market dull. Consumers, it would seem, are using up their supply, and are unwilling to purchase for future needs until present supply is exhausted. We quote, f.o.b. ovens: Connellsville, $1.75 to $2.

Plates and Bars.—A slightly more cheerful tone prevails for this class of material, and dealers are more hopeful. We quote, f.o.b. Cincinnati, as follows: Iron Bars, in carload lots, 1.40c., with half extras; the same in smaller lots, 1.70c., with full extras; Steel Bars, in carload lots, 1.48c., with half extras; the same in smaller lots, 1.80c., with full extras; Base Angles, 1.73c., in carload lots; Beams and Channels, in carload lots, 1.73c.; Plates, ¼-inch and heavier, 1.73c., in carload lots; in smaller lots, 2c.; Sheets, 16-gauge, in carload lots, 2.05c.; in smaller lots, 2.60c.; 14-gauge, in carload lots, 1.95c.; in smaller lots, 2.50c.; Steel Tire, ¾ x 3-16 and heavier, 1.68c., in carload lots.

Old Material.—The market is quiet and demand is exceedingly light. We quote dealers' prices, f.o.b. Cincinnati, as follows: No. 1 Railroad Wrought Scrap, $11 to $11.50 per net ton; No. 1 Cast Scrap, $9.25 per net ton; Iron Rails, $14.50 per gross ton; Steel Rails, rolling mill lengths, $11 to $11.50 per gross ton; Iron Axles, $15 per net ton; Car Wheels, $11 to $11.50 per gross ton; Heavy Melting Scrap, $11.50 per gross ton; Low Phosphorus Scrap, $11.50 to $12 per gross ton.

At the election of officers of the Western Tube Company, Kewanee, Ill., June 7, A. M. Howlett, formerly vice-president, was chosen president; Charles E. McCullough, secretary and treasurer, and John H. Duncan, general sales manager. This election of officers followed the resignation of John F. Pierce, president, and Charles I. Pierce, secretary.

Birmingham.

BIRMINGHAM, ALA., June 6, 1904.

So far as prices are concerned the Iron market the past week showed little change if any from what was chronicled in previous letter. But there was a better tone, due to increased inquiry which was followed by a materially increased demand. While the demand was not an active one, ranging over the entire market, it was sufficient to encourage the expectation of an increased business. One order was worked for one of the Pipe companies, said to be for 10,000 tons or approximately that amount, at something under $9.25 basis for No. 2. Quotations that one can rely upon are very difficult to obtain, as sellers reluctantly name the prices they are accepting. As a rule, only the outside prices are disclosed. So it often happens that in the buying markets we obtain the first inkling of sales made below current quotations.

There are some interests who declare that their schedule is based on $9.50 for No. 2 Foundry. At the same time they have neighbors who are quoting on the basis of $9.25 for No. 2 Foundry, and taking orders that may come their way. Reports are made of lots covering 2000, 1000, 500 and on down to 100 tons on the basis of $9.50 for No. 2 Foundry. Some No. 2 Soft was reported at $9.15, and some No. 2 Foundry at $9.20. Some No. 3 Foundry sold at $8.50, but the interest making the sale would not accept $9 for No. 2 Foundry. Some Gray Forge sold at $8.75, but the order was of a retail character, and that price should not be accepted as the market. It is quoted by other interests as low as $8, but it is hard to get any at this price. At $8.25 it is probable that some could be found. Some specification Iron was sold covering 2 to 2½ per cent. of silicon. This, of course, brought the outside figures quoted.

There were no sales of Basic Iron reported, but the trade was much encouraged by the report of an export sale made at the close of the week, and covering 500 tons, with another order following for 500 more, which at last reports was held up for consideration. These sales, your correspondent is assured, were on the basis of $9.50 for No. 2 Foundry Iron. The sale reported last week for export, it now leaks out, was for 300 tons. Though these sales are not large, they are significant as showing the domestic buyers that they are not the only pebbles on the beach, and that the old outlet for surplus Iron is being dredged for use again.

Your correspondent renews his warning that it would take but a very few days of moderate activity in buying to clean up what surplus stock we have. It is learned that the leading interest has only 30,000 tons on their yards, and this amount will give them only a comparatively small assortment of the various grades. None of the Iron interests is suffering from a burdensome plethora of Iron. There has been no active buying of Iron since early in March, and, when the midsummer buying sets in, it will reach a volume that is bound to have an influence in enhancing prices, and prompt delivery for Iron due in the third quarter will, in many cases, be difficult to obtain.

The commission to examine the properties of the companies contemplating a merger has finished its labors and handed in its report. The substance of it is leaking out day by day, and if half that is said of it be true it will prove to be a most unsatisfactory report. It was understood that the entire mineral and coal properties of each interest were to be ascertained and valued. But the report deals only with the properties already prospected and opened and worked, and simply verifies what each company shows by their maps that it has, so far, accomplished. Attached to the report is a tabulated statement of the various properties they respectively own. Conceived to bring about a merger, it will result in making that object an impossibility. It is simply a case of "the mountain labored and brought forth a mouse."

Among the important corporations filing papers during the week was the Richmond Investment Company, of which Culpepper Exum is president; R. A. Brown, vice-president, and W. W. Crawford, treasurer. The company are capitalized at $50,000, and have a very liberal charter. The organizers are local people of enterprise and plenty of capital.

A wire fence factory, to be located at Ensley, is on the tapis, and there is a good deal of gossip about the establishment of further large Iron works at Ensley. But the matter has not yet reached the stage of certainty. All that can be said now is that the project is being seriously considered by parties who have ample capital to make it a success if they undertake it.

(*By Telegraph.*)

BIRMINGHAM, ALA., June 8, 1904.—Since sending the weekly report the export inquiry has continued, but nothing new has been closed. The export orders accepted last week are now reported to have aggregated 2000 tons. Sellers assert the price obtained was on the basis of $9.50 for No. 2 Foundry. The domestic inquiry has increased and some very fair orders have been secured at prices reported by sellers on the basis of $9.50 for No. 2 Foundry. Some limited lots are yet quoted 25c. less. The feeling that a turn in the market has come is very prevalent.

Pittsburgh.

PARK BUILDING, June 8, 1904.—(*By Telegraph.*)

Pig Iron.—While the market continues quiet, yet at the same time it is true that consumers are taking more interest on account of the very low prices at which Pig Iron is selling. The American Steel Foundries are inquiring for about 3000 tons of Basic Iron for reasonably prompt shipment, and have been quoted $12, Valley, or lower. The Massillon Iron & Steel Company, operating a Cast Iron Pipe works at Massillon, Ohio, have bought about 5000 tons of Nos. 3 and 4 Southern Foundry at a comparatively low price, said to be about $8, f.o.b. Birmingham. The inquiries of the Wheeling Mold & Foundry Company and United States Cast Iron Pipe & Foundry Company are still in the market, but neither has as yet bought. Bessemer Pig Iron is held at $12 to $12.25, Valley, or $12.85 to $13.10, Pittsburgh, Northern No. 2 Foundry is held at about $12.15, Valley, or $13., Pittsburgh, for carload lots. On any large tonnage for extended delivery it is probable that $12 would be done. Northern Forge is held at about $11.50, Valley, or $12.35, Pittsburgh, and we note a sale of 1500 tons to a local consumer at that price.

Steel.—The market is extremely quiet and there is practically no new buying. Consumers are covered by sliding scale contracts and prices of Bessemer Billets on these contracts range from $19 to $20, depending on carbons, while Open Hearth Billets range in price from $19.50 up to $21. Official prices of Bessemer and Open Hearth Billets are $23, Pittsburgh, while Sheet and Tin Bars take $1 a ton advance for long lengths. It is understood that on sliding scale contracts for Sheet and Tin Bars prices range several dollars a ton lower.

(*By Mail.*)

If anything, the situation in the Iron trade generally is duller now than at any time since the present lull started early in April. It is true that latterly inquiries have improved for Foundry, Forge and Basic Pig Iron, and a part of this tonnage has been closed. Other than this the market is extremely dull. While present operations of blast furnaces, Steel works and finishing mills will probably be continued up to July 1, it is very likely that on that date a good many plants will close down, some for repairs and others on account of having no orders. It is evident that the production of Pig Iron, Steel and Finished Material is ahead of consumption, and unless the demand soon improves there will have to be a heavy restriction in output. Prices of Pig Iron are gradually getting lower, both Bessemer and Basic being offered at $12 a ton, Valley, or $12.85, Pittsburgh. The American Steel Foundries are in the market for a considerable tonnage of Foundry and Forge Iron, but have not yet bought. Northern No. 2 Foundry is being offered at $12, Valley, and several lots have been placed at that price. Northern Forge is held at $12.35 to $12.50, Pittsburgh, and a local Pipe company have bought 500 tons at the lower price.

There is not much doing in the Steel market. With the low prices ruling for Bessemer Iron, there is a spread of nearly $10 between the price of Bessemer Iron and the official price of Billets. With the light demand for Steel such a spread can hardly be maintained, and it is probable that at the next meeting of the Billet mills, which will likely be held in New York early in July, the official prices of Billets and Sheet and Tin Bars may be reduced. However, the amount of Steel sold at official prices is small, most consumers having sliding scale contracts, and for this reason the Steel mills may decide to make no change in the price. In Finished Iron and Steel the situation is very quiet and prices generally are weak.

The monthly report of condition of blast furnaces in the Central West territory, to be issued in a few days by J. G. Butler of the Bessemer Furnace Association, will show a larger percentage out of blast on June 1 than on May 1. Other stacks are getting ready to blow out, and there will be material curtailment in the production of Pig Iron after July 1. During May one Edgar Thomson and one Isabella went out. Thomas furnace of the Carnegie Steel Company, at Niles, has gone out, and Claire, of M. A. Hanna & Co., at Sharpsville, will go out this week. Leetonia of the Cherry Valley Iron Company, at Leetonia, will start this week and run until some time in July, when it will be blown out and torn down and a new stack erected.

Ferromanganese.—There is practically nothing doing in the Ferro market, and we continue to quote the best grades of English and domestic Ferro at $41.50 to $42, delivered, for carloads and larger lots.

Muck Bar.—The market is extremely dull and prices are lower. Best grades of domestic Muck Bar made from all Pig Iron are offered at $24.50 to $25, Pittsburgh. On a firm offer this might be shaded.

Wire Rods.—The demand for Rods is extremely dull, in sympathy with Wire and Wire Nails. We quote Bessemer and Open Hearth Rods at $29.50 to $30, Pittsburgh.

Skelp.—There is some demand for sheared sizes of Iron Skelp, and a sale of 1000 tons is reported at a price equal to about 1.50c., Pittsburgh. We quote Grooved Iron Skelp at 1.45c. to 1.50c.; Sheared, 1.50c. to 1.55c., and Grooved and Sheared Steel Skelp at 1.40c., Pittsburgh.

Steel Rails.—Only very small orders are being placed, the railroads continuing to refuse to place orders for Rails unless the price is reduced. It is evident that the Rail tonnage this year will be very much smaller than last year and may not exceed 1,500,000 tons. It is understood that actual tonnage booked for this year is only about 1,100,000 tons. We quote at $28 at mill for Standard Sections, the mills equalizing freights. Light Rails continue low in price and we quote 30 to 45 lb. at $21 to $21.50, maker's mill.

Structural Material.—No large contracts have been placed in the past week in this district, with the exception that the Cincinnati Southern business, placed with the American Bridge Company, and referred to last week, has been increased from 2200 to about 3500 tons. The Wabash viaduct has not yet been given out, but work has started on the elevated line of the Pennsylvania Railroad along Duquesne Way, which will require 5000 tons or more of Steel, and which will likely go to local mills. Bids on this work have not yet been asked. There are a good many small orders being placed, but large contracts, including a good deal of bridge work that is in sight, are very slow in developing. We quote: Beams and Channels, up to 15-inch, 1.60c.; over 15-inch, 1.70c.; Angles, 3 x 2 up to 6 x 6, 1.60c.; Zees, 1.60c.; Tees, 1.60c.; Steel Bars, 1.60c., half extras, at mill; Universal and Sheared Plates, 1.60c.

Plates.—Reports are that a local car interest has taken contracts for about 4000 Steel cars, and this means from 45,000 to 50,000 tons of Plates and small shapes, a part of which we understand has been placed with the leading interest. Reports are current of the cutting of prices of Plates, but most of this is being done by small mills that can roll up to ¼ inch thick, but of narrow sizes only. It is claimed that Plate mills in the association are observing prices rigidly. The general demand is very quiet, and most of the Plate mills are short of work. The Plate Association meets in New York early in July, but whether any reduction in prices will be made remains to be seen. We quote, as follows: Tank Plate, ¼-inch thick and up to 100 inches in width, 1.60c., at mill, Pittsburgh; Flange and Boiler Steel, 1.70c.; Marine, A. B., M. A., and ordinary Fire Box, 1.80c.; Still Bottom, 1.90c.; Locomotive Fire Box, not less than 2.10c., and up to 3c.; Plates over 100 inches to 110 inches in width, not less than 5c. per 100 lbs. extra; Plates over 110 inches to 115 inches wide, not less than 10c. extra; Plates over 120 inches to 125 inches wide, not less than 25c. extra; Plates over 125 inches to 130 inches wide, not less than 50c. extra; Plates over 130 inches wide, not less than $1 extra; Plates 3-16 inch in thickness, $2 extra; gauges Nos. 7 and 8, $3 extra; No. 9, $5 extra. Above prices are on carload lots, f.o.b. at mill, Pittsburgh, with 5c. extra for less than carload lots; terms, net cash in 30 days, and for all points of delivery in the United States except the Pacific Coast.

Sheets.—Shipments of Sheets from the mills are a little larger, due to the fact that a number of concerns will shut down on July 1 for repairs and inventory, and buyers are desirous of accumulating larger stocks. It is possible, too, that there may be trouble this year in arranging the Sheet scale, as some of the independent mills that sign the scale propose to stand out for a reduction of 20 per cent., while the Amalgamated Association offers only a 10 per cent. reduction in the scale formulated in Cleveland recently. Prices of Sheets are only fairly firm, and we quote as follows: No. 26 Black Sheets, box annealed, one pass through cold rolls, 2c. to 2.05c.; No. 27, 2.05c. to 2.10c.; No. 28, 2.15c. to 2.20c., all f.o.b. at mill. Our lower prices are obtainable only on desirable specifications. Galvanized Sheets are held at 2.85c. for No. 26, 3.04c. for No. 27 and 3.23c. for No. 28, in carload lots, f.o.b. at mill. For desirable orders our prices on Galvanized Sheets might be shaded by some mills from 2½ to 5 per cent. Jobbers charge the usual advances over above prices for small lots from store.

Iron and Steel Bars.—The entrance of the International Harvester Company of Chicago into the market as a seller of Steel Bars has disturbed conditions slightly, but it is claimed that mills in the agreement are observing official prices rigidly. Tonnage in both Iron and Steel Bars is a little heavier, probably due to the expected shutdown of a large number of mills on July 1 for repairs and inventory. We quote Iron Bars at 1.35c., Pittsburgh, but on very desirable sizes and for a good tonnage this price might be slightly shaded. We quote Steel Bars at 1.35c., Pittsburgh, in carloads and larger lots, with the usual differential for lass than carloads. On Open Hearth Bars $1 a ton advance is charged.

Hoops and Bands.—New tonnage is light and there is said to be some unevenness in prices. We quote Steel Hoops at 1.40c. and Steel Bands at 1.35c., extras as per Steel card.

Merchant Pipe.—A meeting of the independent Pipe mills was held in this city on Thursday afternoon, May 2, at which lower discounts on Steel Pipe were adopted to conform to those of the leading interest issued under date of June 1. The National Tube Company are now making deliveries on about 4000 tons of 16 and 20 inch line Pipe to the Manufacturers' Light & Heat Company, who are now laying the line. The large gas line for Kansas referred to last week has not yet been placed. The general demand for merchant sizes of Pipe has fallen off somewhat, and the mills are going after tonnage more vigorously than for some time. On 6-inch and larger the mills are pretty well filled up. Pittsburgh basing discounts are as follows:

Merchant Pipe.

	Steel.		Iron.	
	Black.	Galv.	Black.	Galv.
	Per cent.	Per cent.	Per cent.	Per cent.
⅛, ¼ and ⅜ inch	69	59	66	56
½ inch	72	62	69	59
¾ to 6 inches	76	66	73	63
7 to 12 inches	71	61	68	58
Extra strong, plain ends, ⅛ to 8 inches	68	58	64	54
Double extra strong, plain ends, ¼ to 8 inches	60	50	56	46

Boiler Tubes.—The demand for Boiler Tubes is only fair and there is more or less unevenness in prices. Consumers' discounts, which are more or less shaded, depending on the order, are as follows:

Boiler Tubes.

	Steel.	Iron.
1 to 1½ inches	42½	39
1¾ to 2¼ inches	55½	38
2½ inches	58	43
2¾ to 5 inches	64½	50½
6 to 13 inches	55½	38

Merchant Steel.—There is a little better inquiry from Implement makers, but as whole the market is quiet. Specifications on contracts are coming in rather slowly and some of the mills are short of work. Prices are only fairly firm and in some cases quotations are shaded. We quote: Hexagon Steel Bars, 1.60c. for Bessemer and 1.65c. for Open Hearth; Plow Slabs, ¾-inch and heavier, 1.65c.; Tire Steel, smooth finish, ¾ x 3-16 and larger, 1.65c., flat; Plow Steel, 6 inches and under, 1.40c. for Bessemer and 1.45c. for Open Hearth; Carriage Spring Steel, 1.75c.; Railway Spring Steel, 500 tons and over, 1.60c.; carloads, 1.65c.; Small Angles, Channels and Tees, under 3 inches on either leg, 1.45c., base; Toe Calk, 1.85c. to 1.90c. Shafting is held at 52 per cent. off in carloads and 47 per cent. in less than carloads, delivered in base territory.

Tin Plate.—The demand for Tin Plate is quite active, and all the leading mills are filled up for the next month or two. We quote 100-lb. Cokes at $3.40 per box, f.o.b. Pittsburgh.

Spelter.—The Spelter market has quieted, and prices are weak and lower. Sales for June delivery have been made on the basis of about 4.60c., St. Louis, equal to 4.72½c., Pittsburgh. We quote prime grades of Western Spelter at 4.73½c. to 4.78½c., f.o.b. Pittsburgh.

Iron and Steel Scrap.—About the only thing doing in the Scrap market is in the way of small trades between dealers. A number of consumers expect to shut their mills down July 1, and will not take in Scrap at any price. Heavy Melting Stock is nominally $11.50 on gross tons, but on a firm offer this would be materially shaded. There is not enough doing in other kinds of Scrap to establish prices, and we therefore omit quotations.

Coke.—In sympathy with the declining market on Iron and Steel, prices of Furnace Coke are lower, and strictly Connellsville has sold at $1.50 a ton, and in exceptional cases $1.45 a ton at oven has been done. However, a good deal of Furnace Coke is being shipped on contracts, which net the seller $1.60 to $1.65 a ton at oven. Strictly Connellsville 72-hour Foundry Coke is selling at $1.90 to $2 to consumers. Mountain Coke is selling at about $1.40 for Furnace and $1.75 to $1.80 for Foundry, at oven. In the Upper and Lower Connellsville regions last week the output was about 260,000 tons, a decrease over the previous week of about 5000 tons. The prospects are that a number of Coke ovens will be banked in the near future, because of blast furnaces going out of blast within the next month.

Advices from Washington state that domestic postage rates are to be extended to all mail matter originating in the United States for transmission to Hawaii, Porto Rico, the Philippines, Guam, Tutuila and the Panama Canal zone, and *vice versa*. There are now no post offices in the canal zone, but an order of the Postmaster-General, just issued, is designed to meet the future establishment of post offices in that strip.

William Nelson Cromwell of New York has been elected a director of the International Nickel Company, to succeed Charles M. Schwab, resigned.

The New York Machinery Market.

NEW YORK, June 8, 1904.

Another industry kindred, in a measure, to the machinery trades has been crystallized into an association composed of its leading members. It is the small engine and motor and boat building industry. The preliminary details of organization were settled at a meeting held in the Manhattan Hotel, New York, last Monday, which resulted in the formation of the National Association of Engine and Boat Manufacturers. The new association was born under the most favorable circumstances, as the plans of the promoters met with the immediate and hearty approval of the trade at large. The membership roll was signed by 44 of the leading manufacturers in the lines implied by the name of the organization from all parts of the country. The charter of the association, under the laws of the State of New York, was received, and the constitution and by-laws were adopted. H. A. Lozier of the Lozier Motor Company presided, and E. W. Graef acted as secretary. It was decided to postpone the election of officers and an Executive Committee until the next meeting, which will be held at the Manhattan Hotel on June 27. In the meantime Mr. Graef will communicate with all the members, and ask all who cannot attend to signify their choice for these offices. The objects of the association are, in part, as follows: To get special freight rates; to establish a bureau of information; to make special arrangements in regard to and to participate in the profits of shows; to protect its members against adverse legislation and questionable advertising schemes; to bring forward the new and improved methods in construction, and to take such action as will be in the interests of its members as regards alcohol as fuel.

The membership of the association is as follows: The Lozier Motor Company, the Standard Machine Construction Company, the Bridgeport Motor Company, the Gas Engine & Power Company, the American Iron Works Company, the Buffalo Gas Machine Company, the Charles A. Strehlinger Company, the Toquet Motor Company, Panhard & Lavoussour, the Matthews Boat Company, the Isham Company, Fred Hock, the Deleware River Motor Company, Pilmer Brothers, the Standard Boat Company, the E. Gerry Emmons Corporation, Norwood Brothers & Co., the Eagle Bicycle Company, the Cushman Motor Company, the Wolverine Motor Works, Lacey Brothers, the Chase Pulley Company, A. Barrett's Sons, the Pearson Boat Construction Company, Termadt & Monahan, the Truscott Motor Company, the Pierce Engine Company, the White Craft & Power Company, Charles Durkee & Co., the Smalley Motor Company, the Miamus Motor Company, the Outing Boat Company, the Remy Electric Company, William Roche, the Stanford Motor Company, E. W. Graef, the Smith & Mabley Mfg. Company, the Milton's Pont Ship Yards, T. S. & A. D. Negus, the Electric Launch Company.

It was expected in the machinery trade that developments of the last week would result in a considerable amount of business being placed by the two large contracting firms who will build the tunnels under the North and East rivers for the Pennsylvania Railroad. Nothing transpired, however, and we were advised at the offices of the contractors today that no developments can be expected before next week, when they hope to have things in shape to begin the placing of their large contracts. A representative of S. Pierson & Sons, Limited, of London, who have the contract for the East River section, is now in this country and will open offices soon at the Long Island City shaft of the tunnel.

The Westinghouse-Church-Kerr Company, who have designed the power station to be located at the Long Island end of the system, are still buying machinery equipment for installation in this station in large quantities. They have done nothing, however, in connection with the power station to be located at the Jersey end of the route.

In connection with the large bid for machinery issued by the Chicago, Topeka & Santa Fé Railway System, which we printed in full in our issue of last week, no orders of importance have been placed as yet. There is a report current in Liberty street to the effect that a small portion of the machinery was purchased the latter part of last week, but no one seems to have specific information as to what class of machinery is alluded to or as to the identity of the fortunate bidders.

We have just received authoritative information concerning the new shops to be built at Memphis, Tenn., by the Illinois Central Railroad Company. There will be an addition to the machine shop 110 x 120 feet inside and a new blacksmith and boiler shop 80 x 220 feet. The work on the new buildings has just been commenced, and it is hoped to have them finished before the end of this summer, when the subject of machinery equipment will be entered into. The list of machinery to be installed has not even been compiled up to this date. The matter is now in charge of A. S. Baldwin, engineer of construction, whose offices are located in Chicago.

A new machinery concern has been organized in Newark, N. J., under the style of Zeh & Hahnemann, whose product will be power, screw and foot presses and similar machinery.

The firm have just ordered a fair sized equipment of machine tools, and expect soon to have their plant in operation and their product on the market. The order for the entire equipment for the new shop was placed with the J. R. Vandyck Company of 8 Dey street, New York. The equipment will consist of a Whitcomb planer, several Bradford lathes, a Fosdick radial drill, a Milwaukee milling machine, a Queen City shaper, together with a number of miscellaneous speed lathes, grinders, drilling presses, band saw, cold saw, trimmers and small tools.

The Philadelphia Rapid Transit Company, Philadelphia, Pa., are building an extension power plant on Second street, near Wyoming avenue. The building, steel work for which is being furnished by American Bridge Company, will be 57 x 139 feet, with a rear addition 60 x 70 feet. The equipment for this plant was recently purchased, the total installation of which will be about 6000 kw. in four units of 15,000 kw., which are under construction. The turbines will be furnished by the Westinghouse Machine Company, Pittsburgh, Pa., the condensers by the Alberger Condenser Company, New York, and the boilers by the Parker Engine Company, Philadelphia.

Considerable new machinery will probably be required by the Geiser Mfg. Company, Waynesboro, Pa., who are to equip a new and larger plant for the manufacture of Metcalfe gas engines. These engines were formerly made at Quincy, Pa., and on May 29 the plant was destroyed by fire, entailing a loss of $50,000. The company have purchased the plant of Greencastle Mfg. Company, Greencastle, Pa., which they will equip and put in shape as rapidly as possible with the expectation of building the gas engines within two or three months. The demand for the Metcalfe engines has increased rapidly, and the new works will have a much larger capacity than the old.

A quantity of equipment, including wood working machinery, hydraulic press and boilers and engines, are required by Ernest Gabler & Bro., 409 East 107th street, New York, who are to erect a new piano factory, 96 x 104 feet, five stories high, on Whitlock avenue.

The public auction sale of the plant of the defunct Morse Iron Works, Brooklyn, N. Y., which was scheduled to be held in the Real Estate Exchange in that city on May 31, has been indefinitely postponed until matters can be satisfactorily adjusted between the first and second judgment creditors, the latter of whom got out an injunction which prevented the sale. The property will be put under the hammer at a future date.

The Kabley Foundry Company, Worcester, Mass., are to erect a new foundry building this season, to replace present wooden buildings. A part of the new structure will be built over present buildings. The new building will be about 200 x 80 feet, of brick and steel, with monitor roof. It will be equipped with a 10-ton traveling crane. The company will also buy electric generators to provide electric power in operating parts of the foundry. The old furnaces will be adequate for the present.

The equipment of the insolvent Northrop Iron Works at Valleyfield, Quebec, the manufacturers for Canada of the Draper looms, has been purchased by the Fairbanks Company, who will dispose of the machinery at auction at their Toronto warehouse on July 2. The list includes over 100 machine tools, such as molding and foundry equipment, pattern shop equipment, air compressor, &c., all of the highest grade American make. A copy of the list of tools to be sold will be issued by the Fairbanks Company this week, and the tools will be sold to the highest bidder in order to get rid of them quickly. This should prove an exceptionally good opportunity to get first-class tools at a very low figure.

An announcement is being sent to the trade by J. J. McCabe, 14 Dey street, New York, stating that the entire equipment of several large machine shops, having an exceptionally good assortment of modern machine tools, has just been purchased by him. The announcement contains a list of the machine tools, including a large number of the best makes of lathes, planers, upright and radial drills, shapers, boring mills, milling machines, screw machines, gear cutting machinery, universal grinders, boiler shop tools and miscellaneous machinery.

A large amount of machinery is included in the 26 flour milling plants of the Eastern Milling & Export Company, which are to be sold at receivers' sale under decree of foreclosure on Tuesday, August 2, in the office of the clerk of the United States Circuit Court, Room No. 2, United States Post Office Building, Ninth and Chestnut streets, Philadelphia. While the plants are all to be sold intact, it is believed in the trade that a number of the purchasers will dismantle some of them and dispose of the machinery equipment.

A new concern organized under the style of the Mead-Morrison Mfg. Company, have been formed to take over the entire coal handling machinery business of the John A. Mead Mfg. Company of Chicago and New York. The latter concern and also John A. Mead & Co., will continue manufacturing and installing conveying and tramway systems, &c., in connection with other lines than the coal handling branch. The directors of the new company are Eugene N. Foss, treasurer of the B. F. Sturtevant Company, Boston, Mass.; John G. Morrison, president of the Rawson & Morrison Mfg. Company, Cambridge, Mass.; Benjamin D. Brown, vice-president of the John A. Mead Mfg. Company; W. S. Martin, Jr., who is to be the general manager of the Mead-Morrison Company; Col. W. G. Hoyt, Manchester, N. H., and Arthur P. French, Boston, Mass. Mr. Foss will be president and Mr. Morrison treasurer of the new company. Orton G. Dale will manage the New York office, which is to be located in the Bowling Green Building.

Hendrick Mfg. Company, Carbondale, Pa., manufacturers of perforated sheet metals, will open a sales office in the Singer Building, 149 Broadway, New York, which will be in charge of C. K. Thompson.

The Railroad Supply Company have removed their Eastern sales department from the Engineering Building, 114 Liberty street, to the Central Building, 143 Liberty street, New York. H. H. Greene, formerly Eastern sales agent, has severed his connection with the company and Geo. S. Bailey and H. M. Buck have been appointed Eastern representatives.

Geo. Rahmann & Co., New York, have removed from 31 Ferry street to a larger and more commodious building at 6 Ferry street.

Yale & Towne Chain Blocks at the World's Fair.

A feature of the St. Louis Exposition which has attracted attention is the exhibit of Yale & Towne chain blocks in Machinery Hall. Block 29 is occupied by this exhibit and that of the Brown Hoisting Machinery Company, Cleveland, who purchased the Yale & Towne crane business in 1895. About 60 blocks, ranging in capacity from ⅛ ton to 20 tons, are shown. These embrace the three types, differential, screw guard and spur geared, manufactured by the Yale & Towne Mfg. Company, 9 to 13 Murray street, New York.

The exhibit, as a whole, is attractively arranged, both as regards the types and the sizes of the various hoists. Possibly the most interesting part is the moving exhibit. This is an arrangement by which one of each of the three kinds of chain blocks is driven by electric motors, which supply equal power to each in lifting 1000-pound weights. The triplex block lifts about 6 feet in 30 seconds, during which time the duplex and differential blocks hoist only about half as far, because they do not possess the high efficiency of the triplex. The belting for all the blocks is so proportioned that the motors are doing equal work, and the relative efficiency of the blocks is shown by the speed of the load and the hight to which it is lifted in half a minute. The entire arrangement shows at a glance the relative efficiency of the three types of blocks. The mechanism is automatic. When the load which travels fastest reaches the top it reverses, and the weights lower and begin over again. Instruments to measure the electric current are connected with each hoist, by which the absolute and the relative amount of power required to lift each load are indicated. It is a fact of more than usual interest to note in this connection that the Yale & Towne triplex blocks have been used quite generally in installing the various exhibits in Machinery Hall.

Hudson Iron Company.

Secaucus Furnace, at Secaucus, N. J., has been taken on by a new company, the Hudson Iron Company, who are a reorganization of the Eastern Iron Company, Bowling Green Building, New York. The new company, capitalized at $1,500,000, have secured considerable additional capital and will spend about $600,000 in making improvements to the properties, which will include the erection of a by-product coke plant. The company also control mines at Gouveneur, N. Y., and have recently acquired others. It is their intention to repair the furnace, which has been closed for some time, and put it in blast. The officers are: Chase Andrews, president; Harold G. Villard, vice-president, and J. M. Clark, secretary and treasurer. The general manager is Albert Trinler, who was manager of the Eastern Company, and who was formerly manager of the National Steel Company's plant at Sharon, Pa.

Current Developments in Canada.

The Government and the Sydney Strike.

TORONTO, June 3, 1904.—Possibly the budget speech of the Finance Minister of the Dominion, which is promised for Tuesday, may have announcements that will modify the situation at Sydney, where a large number of the Dominion Iron & Steel Company's men are now on strike. If he should greatly increase the protection of the steel industry the company might be willing to offer the men better terms. The fact that the directors proposed the 16th inst. as the date for a conference with officers of the Provincial Workmen's Association may have some significance, as it was generally known when the proposal was made that Finance Minister Fielding meant to deliver his budget speech on the 7th inst., and that President Plummer would arrive home from England on the 15th.

Whether Mr. Fielding will make any remedial changes in the tariff cannot of course be known outside of the Cabinet at the time of this writing. A petition has been laid before him to subject all staple steel products to protective duties.

The following memorial was sent by the Sydney Board of Trade to the Minister of Labor at Ottawa on the 1st inst.:

The Sydney Board of Trade, at a meeting held to-day, unanimously resolved to ask your intervention in the existing trouble between the Dominion Iron & Steel Company and their employees, which has resolved itself into a general strike that threatens to very seriously affect this community. Briefly stated, the employees' contention is that they are not receiving a living wage, nor their just proportion of the bounties paid by your Government to the company. The company, on the other hand, contend that they are paying average wages, and offer to arbitrate upon this point. The Board of Trade has therefore passed the following resolution: "That in view of the large bounty paid by the Government to the iron and steel industries in Canada, the Government be requested to intervene along the following lines—namely, to require the company to show the condition of their affairs to such persons as the Government may see fit to appoint, with a view either (a) to convince the employees that they are not yet in a position to accede to the demands for higher wages, or (b) to bring such pressure to bear upon the company as will lead to immediate settlement of existing difficulties."

In the House of Commons on the 2d inst., Mr. Barden, the leader of the Opposition, referred to this memorial, of which he had advice, and asked the Government for information as to its intentions in regard to the matter. This would seem, he said, to be a special occasion for the interference of the Government. If the strike continued it was likely that 5000 or 6000 people would leave the Province and endeavor to find homes in the United States. It was of the utmost possible importance that everything should be done by the Government to bring the strike to an end and cause the company to resume operations.

Mr. Fielding, speaking for the Minister of Labor, who was absent, said the Government's utmost endeavors would be applied to the business of bringing about an understanding, and that the matter was at present engaging the attention of the Department of Labor.

It is not only as a medium of conciliation that the Minister of Labor is concerned. He is also supposed to take the side of Canadian labor against foreign labor. There is an alien labor law on the Dominion statute book which prohibits the bringing of workmen into the country under contract. Lately the alien labor question has been brought into prominence in another connection. Charges were made in the House that the law relating to it was being disregarded in the employment of engineers for surveying the Grand Trunk Pacific Railway route. Of course, the Government, who may bring on a general election within a few months, could not afford to seem indifferent towards the labor element, and a commissioner was appointed to examine into the charges, and he is engaged upon them now. To take the places of the strikers at Sydney men would have to be brought from the United States or elsewhere, as Canada has not yet got a large body of trained labor of the kind required. Should the Minister of Labor not exert himself to prevent an immigration of these skilled aliens, the Government might find the whole union labor vote polled against it in the coming elections.

Grand Secretary Moffat said in an interview at Sydney: "Only the importation of non-union labor to run the plant will be resented and in this event the miners are ready to cut off the coal supply by refusing to dig it from the earth. With their present supply of coal, the Steel Company's plant could not be operated over 24 hours."

The Provincial Workmen's Association controls the situation in the coal, iron and steel industries of Nova Scotia, so far as these are subject to organized labor. It is particularly strong in Cape Breton, Pictou and Cumberland, where these industries are established. It is largely political, and is completely independent of the Trades and Labor Congress at Canada.

Trouble between the company and its employees first began when notice was sent out that a reduction in wages, varying from 10 to 33 1-3 per cent., would go into effect on the 1st of December last. This was strongly resisted, and powerful influences and persuasions had to be brought to bear to prevent a strike at the time. Local members of the Dominion House of Commons and local representatives in the Provincial Legislature used their good offices to reconcile the parties. They were assisted by members of the Dominion Government, and the Town Council and Board of Trade undertook to see that rents were reduced and provisions cheapened in some proportion to the cut in wages. The men consented to accept the reductions. On the 1st of March the company advanced the wages of the laborers from the reduced rate of $1.26 per day to $1.30. About the middle of last month the Provincial Workmen's Association asked for the restoration of the rates paid up to the 1st of December in all departments. Non-compliance with this demand brought on the strike. C. A. C. J.

National Metal Trades Association Notes.

CINCINNATI, OHIO, June 6, 1904.—The monthly foremen's meeting of the Cincinnati Metal Trades Association will be held at the association's rooms Thursday evening, June 23. This meeting will be accompanied by a smoker and a lunch.

The New York Metal Trades Association held a conference with the Conciliatory Committee of the National Civic Federation on June 2. At this meeting representatives of the striking boiler makers were present, and the discussion was practically confined to one question—the open shop *versus* closed shop. At the request of the Civic Federation on the following day, Messrs. Palmer, Bowman, Cunningham and Hunter attended another meeting. The boiler makers' committee stated they had no authority to modify the demand for the closed shop, and when this was reported to the Metal Trades Association the sentiment was unanimous that no compromise would be made. Full support of all their customers has been promised to the New York Metal Trades members, and many of them are holding back work awaiting the convenience of the employers.

The pattern makers who struck in St. Louis, in the shops of the Remmers Pattern Company and Fulton Iron Works, have applied for reinstatement under old conditions.

The Citizens' Industrial Association of St. Louis, whose secretary is Ferd. Schwedtmann, formerly a member of the Administrative Council of the National Metal Trades' Association, announces that it will publish an official journal, which will be called the *Citizens' Industrial Exponent*, and will be a 24-page magazine, devoted principally to the open shop propaganda and the organization of employers and citizens.

The Pittsburgh Manufacturers' Association reports that, for the first time since the inauguration of its labor bureau, not a single call for help was received from the members during the week. Up to last Saturday no request had been received from the machinists at Pittsburgh for a conference, nor has any announcement been made by the machinists as to what they intend to do at the expiration of the present agreement on July 1.

The machinists of Youngstown formerly employed in the shops of the William Tod Company and Lloyd, Booth Company have accepted a 4 per cent. cut in wages and have returned to work on that basis. This 4 per cent. is in addition to the 5 per cent. cut made last December.

Commissioner Du Brul and Secretary Wuest proceeded to Chicago on Thursday night, and found conditions in very good shape. The Chicago Metal Trades Association has decided to hold no more conferences, but is proceeding to fill the shops. Mr. Wuest will remain in personal charge of the National Association's interests in Chicago. Over 150 applications were received by the local association last week from Chicago machinists to go to work in the struck shops. The National Association is sending into Chicago practically the whole crew of strike breakers at its disposal. In addition the local bureaus have been requisitioned for all the help they can supply. Besides these preparations the National Association is sending men to different cities to pick up nonunion men and bring them into Chicago. The Chicago association had information that a wrecking crew of union men, under orders of District No. 8 of the International Association of Machinists, was being sent to take employment in the struck shops with the avowed purpose of damaging the machinery and tools. Both the local and national members are holding daily meetings and every precaution is being taken to prevent the wrecking as well as to apprehend and convict the wreckers.

The machinists employed in the International Harvester Works at Hamilton, Ontario, threaten a strike because a machinist is required to run two milling machines instead of one. About 125 men will be affected.

Every building in Cincinnati in which plumbing work is going on carries a large placard offering $100 reward by the Employers' Association for the arrest and conviction of any party damaging the plumbing work. No less than four cases of such vandalism occurred during the past week, causing damages ranging from $250 to $1500. A plumbers' strike has been on in Cincinnati since last November.

New York.

NEW YORK, June 8, 1904.

Pig Iron.—The market has been very dull and prices are easier. Our monthly blast furnace report, printed elsewhere, shows that the accumulation of Iron during May was relatively small at the Eastern furnaces. We quote: Northern No. 1, $14.75 to $15.25; No. 2 Foundry, $14.25 to $14.50, and Gray Forge, $13 to $13.25, tidewater. Tennessee and Alabama brands are $12.75 to $13 for No. 2 Foundry and $12.25 to $12.75 for No. 3 Foundry.

Cast Iron Pipe.—The Department of Water Supply of New York will open bids on Wednesday of next week for about 2800 tons. This is the largest letting now in sight. Trade is further inclined to quietness, the volume of business in small lots having fallen off considerably, and, while the foundries are well supplied with work on contracts previously taken, competition is keen on anything now coming out. Quotations on carload lots continue as previously reported at $28 per gross ton for 6 to 10 inch and $27 for 12-inch upward, at tidewater, but anything desirable could easily be placed at lower rates.

Finished Iron and Steel.—The market is very quiet. It is difficult to learn of any transactions of moment. The Structural trade presents nothing new. Bridge work is slow and the building trade is disappointingly inactive, so far as structures are concerned which involve the consumption of steel. The boiler makers' strike shows some indications of collapse, as a few shops are now able to run. Sales agents for Plate mills report profound dullness, which they expect will give way to a little trade as soon as the strike is ended. Bar Iron is still firmly held, but trade in this line is also light. We quote, at tidewater, as follows: Beams, Channels, Angles and Zees, 1.74½c. to 2c.; Tees, 1.79½c. to 2c.; Bulb Angles and Deck Beams, 1.84½c. to 2.05c. Sheared Plates in carload lots are 1.74½c. to 1.85c. for Tank, 1.84½c. to 2c. for Flange, 1.94½c. to 2.10c. for Marine and 1.94½c. to 2.50c. for Fire Box, according to specifications. Refined Bar Iron and Soft Steel Bars, 1.49½c.

Old Material.—Trade in Old Material of all kinds seems to have come to a standstill. Offerings of large quantities of all grades are numerous, but dealers and consumers are not interested except when very low prices are named. Railroad companies especially have been trying to dispose of part of their heavy accumulations of Relaying Rails, but have been unable to make sales. Companies who formerly were able to dispose of all their Scrap to mills located along their lines are now making strenuous efforts to find customers in the general market. Quotations are difficult to make and the following prices are reported as about what holders might be able to realize per gross ton, New York and vicinity:

Old Iron Rails	$14.00 to $14.50
Old Steel Rails, long lengths	12.00 to 12.50
Old Steel Rails, short pieces	10.00 to 10.50
Relaying Rails	16.00 to 17.00
Old Car Wheels	10.00 to 11.00
Old Iron Car Axles	15.50 to 16.00
Old Steel Car Axles	14.00 to 14.50
Heavy Melting Steel Scrap	10.00 to 10.50
No. 1 Railroad Wrought Scrap	11.50 to 12.00
Iron Track Scrap	10.50 to 11.00
Wrought Pipe	8.00 to 8.50
Ordinary Light Iron	6.50 to 7.00
Cast Borings	3.50 to 4.00
Wrought Turnings	5.50 to 6.00
No. 1 Machinery Cast	10.00 to 11.00
Stove Plate	8.00 to 8.50

Metal Market.

NEW YORK, June 8, 1904.

Pig Tin.—Further reductions in prices and continued lagging of demand have characterized the markets both here and in London throughout the last week. Consumers are evidently well supplied for the present, and are entertaining no apprehensions as to the future, for it is reported in the trade that several offers of large lots at terms which ordinarily would prove very enticing were turned down flatly by the consumers. Yesterday there were free offerings of spot at 26.75c. At the close to-day the market was a trifle steadier, being quoted 26.70c. to 27c. June was offered at 26.50c. The London cables announced £121 17s. 6d. for spot, and £121 7s. 6d. for futures. The arrivals so far this month amount to 985 tons, and the quantity afloat is figured at about 2294 tons.

Copper.—A reduction of ¼c. was made during the week, but it had no influence in bringing purchasers into the market. The situation is as dull and uninteresting as ever, there being an extremely small amount of inquiry despite the efforts on the part of sellers. Prices at this writing are as follows: Lake, 12.75c. to 13c.; Electrolytic, 12.62½c. to 12.87½c.; Casting, 12.37½c. to 12.50c. London has declined to £56 10s. for both spot and futures and £60 5s. for Best Selected. The exports thus far this month aggregate 2994 tons.

Pig Lead.—The market is quiet and easy. Here the tone has softened somewhat and in St. Louis a reduction has been made. In London, however, an advance was noted this afternoon. Prices are as follows: Spot, 4.25c. to 4.35c.; St. Louis, 4.12½c.; London, £11 13s. 9d. The price of the American Smelting & Refining Company for Desilverized in 50-ton lots, shipments to be made at the option of the company within two to four weeks, remains unchanged at 4.25c.

Spelter is weak and lower. Business is still on a very small scale, and the market is generally without interest. Spot is quoted here 4.75c. St. Louis telegraphs sellers at 4.60c., and the London market has declined to £21 15s.

Antimony.—Has both declined and advanced according to brand. Cookson's declined to 7.25c., and Hallett's advanced to that figure. Other brands are quoted 6.25c. The demand is very slight.

Nickel.—The usual amount of business is passing and prices are firm, large lots being quoted at 40c. to 45c. and smaller quantities at 50c. to 60c.

Quicksilver.—The market is quiet, with ample stocks and a demand of moderate proportions. Flasks of 76½ lbs. are quoted at $45. The London price has declined to £8.

Tin Plate.—The market is unchanged, with a fair demand reported. Quotations are very firm, on the basis of $3.45 per box for 14 x 20 100-lb. Cokes, f.o.b. mill, equivalent to $3.64, New York. The Welsh market has declined 1½ pence, to 11 shillings 4½ pence, f.o.b. Swansea.

The Bar Iron Conference.—On Tuesday the Wage Committee of the Amalgamated Association, headed by Theodore J. Shaffer, president, met the manufacturers in conference at Cambridge Springs, Pa. It is probable the sessions will last for several days before the puddling and bar iron scales for 1904-05 have been arranged. The base of the puddling scale is $5 on a 1-cent bar iron card, and it is likely the manufacturers will insist that this be lowered to $4.50 or $4.75 a ton. The manufacturers are represented by James H. Nutt, secretary of the Labor Bureau; G. Watson French, chairman of the Executive Committee; Charles Hart, general manager; Thomas Parrock, manager of the Youngstown district, and J. G. Caldwell, manager of the St. Louis district—all of the Republic Iron & Steel Company—and S. D. Leonard of the American Car & Foundry Company. The boiling and bar iron scales expire on July 1, but if it should happen that new scales for 1904-05 are not arranged until after that date, the present scales will continue in force until a settlement is reached.

HARDWARE.

THE theory that the manufacturer should sell to the jobber and the jobber to the retailer, to whom should be left the distribution of the goods to the consumer, is very well as applied to a certain class of products, which can be distributed most economically and advantageously in this way, but there are a host of exceptions where a more direct marketing of the manufacturers' product is not only justified, but necessary. A great many manufacturers of a new article, something perhaps in the line of Mechanics' Tools or other utensil unknown to the public, for which consequently there is no demand, desire to find a market for it. In loyalty to the theory above enunciated, and as the readiest means of disposing of it at a moderate outlay, the manufacturer with characteristic faith in his product and with a certain simplicity of confidence in the jobbers gives them an opportunity to market it. Needless to say it is explained to him more or less diplomatically that they cannot spend the time of their Knights of the Grip in exploiting the merits of an unknown article, but that as soon as there is a demand for it they will be pleased to handle it, and perhaps push it. The manufacturer thus learns through an experience which is not altogether pleasant that if he is to follow the theoretical course laid down in the very pretty principle enunciated his goods will have to stay in his wareroom, for the simple reason that the jobbers will not touch them. The theory of distribution has broken down at the outset.

The manufacturer in this state of things, driven to find another channel, sends his travelers and agents at no inconsiderable cost direct to the retail merchants. In this field his efforts are attended with better success, and yet it is after all slow and unsatisfactory work. The merchants, even those whose business it is to supply consumers, hesitate to take up the new tool or utensil. It would require on their part a good deal of talking to introduce it, and there are other tools and utensils with which their customers are familiar which seem to answer the purpose reasonably well and may be said to sell themselves. The manufacturer thus makes little progress, and while his faith in the merit of his product has increased he is a sadder and wiser man in view of the difficulty of finding a place for it in the market. Even the retail trade are not eager to do missionary work in helping him to dispose of his product.

At this point, or before, many a manufacturer has become discouraged, and perhaps turns over the enterprise to some manufacturer of more experience and wider connection and bends his energy to other tasks. Or it may be that having skipped the jobber and gone direct to the retailer, with a slight but meager measure of success, he breaks away still further from the restriction of the theory with which he started out, and passing by both the jobber and the retailer, goes direct to the consumer. By means of canvassers or circulars or popular advertising in one form or another, he succeeds at last in inducing the mechanic, the housewife or the farmer, as the case may be, to purchase the article which the jobbers and the retailers are unwilling to handle. In this way little by little his product finds favor and makes a place for itself in the great world in which so many commodities are jostling one another. He thus lays the foundation of a business, and by and by the retailers, and after a while the jobbers, are willing to take it up.

Care must be taken in such a case as this, and it is only one in a multitude, not to attach blame unjustly to any of the parties concerned. The retailer and the jobber, in loyalty to the manufacturer and with a view to making their position stronger and more useful and therefore more influential, should, perhaps, have been more ready to go out of the beaten track and help to introduce the article in question. It must, however, be borne in mind that there are limitations to this kind of work, and each merchant must decide for himself whether it is going to pay him in the long run to expend his energies in labor in which there is comparatively little immediate profit when the same effort expended in other ways would yield a larger result. Blame, if any, must be given sparingly, for the conduct of business is under the laws of trade, which are inexorable in their requirement of economy of effort and in their demand for practical results. Perhaps the jobber and the retailer did right in refusing to handle the manufacturer's novelty. Perhaps there was, after all, more money in passing it than in taking it up. The manufacturer certainly who has passed by both the jobber and the retailer under these circumstances has pursued the right course. Under the categorical imperative to market his goods he has followed the only course open to him.

We have referred at length in this hypothetical case to a condition and a course of action which find constant illustration in the trade. The theory that the manufacturer should sell only to the jobber and the jobber sell only to the retailer commends itself as a simple and well sounding proposition, but it is subject to so many exceptions and limitations that in regard to a great many articles, and even lines of goods handled by the Hardware trade it breaks down utterly. The test of such a theory is found in its applicability to the various conditions existing in the business world, where mere theory, unless founded upon real principle, counts for little.

In connection with the current discussion in regard to methods of distribution it should always be remembered that the catalogue houses whose competition is under consideration are those the essential characteristic of whose business is the sale of goods to consumers. The principle of marketing goods by merchants by means of catalogues is familiar to the trade and the practice recognized as unobjectionable and, indeed, commendable. Practically every jobber and manufacturer makes this an important part of his business, as the mail order department has its place and a large place in the activities of his house. There have been and are houses who use catalogues exclusively in soliciting business from merchants, and this method of finding a market is not open to the objections which apply to the catalogue house methods which are under discussion. It is possible, indeed, that the success with which goods are disposed of to consumers by means of catalogues may induce an increasing use of catalogues as a means of marketing goods to the trade. If it can be shown that this can be done with economy and efficiency it is safe to say that there will be an indefinite increase in the use of catalogues as the means of communication with retail merchants. This is possibly one of the tendencies of the present agitation, the development of which will be watched with interest. Thus far the traveling salesman has certainly held his own and has to-day an assured place in the commercial world. It remains to be seen whether new methods will work any change in his position.

Condition of Trade.

The advent of summer weather brings with it something of the quiet which characterizes the summer season, but the lull in business comes perhaps a little earlier than usual. Retail merchants throughout the country, with whom business during the past year was generally very satisfactory, find existing conditions reasonably good, their customers calling not only for seasonable commodities but for Hardware generally in a way that indicates that their communities are doing well and are in a position to buy freely. Their stocks accordingly are, as a rule, kept up to a good working level, making it unnecessary for them to purchase much except in a sorting up way. Business of this character, and in supplying the merchants who have been slow in buying, and the securing of orders in some cases for later shipment, gives the jobbers fair occupation and little reason to complain. Manufacturers are becoming reconciled to a lessened pace than they have been obliged to keep up and are beginning to accumulate goods. They are, however, unwilling to lay in very heavy stocks, as they are apprehensive of the course of the market, and many of them are accordingly letting up a little in the matter of production. Very wisely, they refrain from forcing sales at the present juncture, and a conservative policy in the matter of prices is pursued by most of them. The changes in quotable values of goods are of minor importance, but the general tone of the market is not strong. The various influences which work together to determine the course of things commercially and the character of business at large, such as the crop prospects, the Presidential election, the probable course of the Iron and Metal market, are being canvassed and reviewed, as they will doubtless continue to be during the coming months. Such speculations and conjectures tend at least to relieve the monotony of business, even if they do not remove the uncertainties which lie before the trade. Meanwhile, with reasonably healthful conditions and a fair trade in hand and in sight, merchants and manufacturers can go ahead conservatively and anticipate a good return for their efforts.

Chicago

There seems to be absolutely no change either for the better or worse in the Hardware situation in Chicago, viewed both from the standpoint of jobber and retailer. It is encouraging, to say the least, that business has not fallen off, when every one was expecting that it would. We have been blest with a few warm days again and this has quickened the retail trade sufficiently to counteract the natural decline at the end of the spring season. Warm weather goods are in demand in proportion to the temperature and the demand rises and falls with the mercury.

NOTES ON PRICES.

Wire Nails.—The new business coming to the mills is small, and contract orders are about all filled. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carload lots	$1.90
Retailers, carload lots	1.95
Retailers, less than carload lots	2.05

New York.—During the present week demand for small lots from store has been very satisfactory, owing to some extent to pleasant weather. Quotations are as follows: Single carloads, $2.10; small lots from store, $2.20.

Chicago.—Prices are unchanged, as follows: Carload lots to jobbers, $2.10 per 100 pounds; less than carloads to jobbers, $2.15 per 100 pounds; carloads to retailers, $2.15 per 100 pounds; less than carloads to retailers, $2.25 per 100 pounds, all f.o.b. Chicago.

Pittsburgh.—New demand for Wire Nails is very dull and the leading mills are actively seeking business for the first time in some months. There are still some contracts to be filled, but these are being cleaned up pretty fast, and unless demand soon improves some of the Wire Nail mills will be short of specifications before long. The tone of the market is fairly firm. We quote Wire Nails, $1.90 in carloads to jobbers, $1.95 in carloads to retailers, and $2 to $2.05 in small lots to retailers, all f.o.b. Pittsburgh, 60 days, or 2 per cent. off for cash in 10 days, plus actual rate of freight to point of delivery.

Cut Nails.—The situation is about as last reported, demand being moderate, with slight irregularities in prices in some sections of the country. Quotations are as follows for Steel and Iron Nails, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Base.
Jobbers, carload lots	$1.75
Jobbers, less than carloads	1.80
Retailers, less than carloads	1.90

New York.—Demand keeps up to about the proportions of the last few weeks, which have been moderate. It is reported that some of the local jobbers occasionally shade regular quotations slightly when necessary to meet competition. Quotations are as follows: Carloads on dock, $1.89½; less than carloads on dock, $1.97½; small lots from store, $2.05.

Chicago.—Prices are as follows: Carload lots, both Iron and Steel Nails, Chicago, to jobbers, $1.91½, base; less than carloads, $1.96½. Retailers and large consumers pay 10 cents per 100 pounds above jobbers' prices. Jobbers sell at from $2.10 to $2.30, base, f.o.b. Chicago warehouse, according to customer, size of order, &c.

Pittsburgh.—Demand is light, as it usually is at this season of the year, and to a few points of delivery slight concessions in prices are being made. We quote Steel and Iron Cut Nails at $1.75, base, in carload lots, and $1.80 in less than carloads, f.o.b. mill, terms 60 days, less 2 per cent. off in 10 days.

Barb Wire.—There is a lack of new business, and contract orders will soon be filled. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Galv.
Jobbers, carload lots	$2.20	$2.50
Retailers, carload lots	2.25	2.55
Retailers, less than carload lots	2.35	2.65

Chicago.—Prices are unchanged, as follows: Carload lots, Painted Wire, $2.40; Galvanized, $2.70; to retailers, carload lots, Painted, $2.45; Galvanized, $2.75; to retailers, less than carload lots, Painted, $2.55; Galvanized, $2.85; Staples to jobbers, $2.25 for Plain and $2.65 for Galvanized, with 5 cents advance to retailers.

Pittsburgh.—New business is very light, but the mills are running on contracts, which, however, will soon be filled. It is probable a number of Wire Nail mills will close down on July 1 for inventory and repairs. Quotations are as follows, f.o.b. Pittsburgh, terms 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Galv.
Jobbers, carloads	$2.20	$2.50
Retailers, carloads	2.25	2.55
Less than carloads	2.35	2.65

Smooth Fence Wire.—New business is received in fair volume, and mills are still occupied filling contract orders. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads	$1.80
Retailers, carloads	1.85
Less than carloads	1.95

The above prices are for base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:

	6 to 9	10	11	12&12½	13	14	15	16
Annealed	Base.	$0.05	.10	.15	.25	.35	.45	.55
Galvanized	$0.30	.35	.40	.45	.55	.65	1.05	1.15

Chicago.—Prices remain as follows: Smooth Fence Wire, sizes 6 to 9, $2 per 100 pounds in carload lots to jobbers, f.o.b. Chicago; $2.05 per 100 pounds to retailers in carload lots and $2.10 in less than car lots.

Pittsburgh.—A fair amount of new tonnage is being placed, but the mills are running mostly on contracts.

We quote as follows, f.o.b. Pittsburgh, terms 60 days, or 2 per cent. discount for cash in 10 days: Plain Wire, $1.80, base, for Nos. 6 to 9, in carloads to jobbers, and $1.95 to $2 in small lots to retailers; Galvanized, 30 cents extra for Nos. 6 to 14.

Shovels and Spades.—Prices on the common goods are forced down to a pretty low level on account of the urgency of competition. On the better grades also prices, while more remunerative, are not satisfactory except to manufacturers whose facilities are of the best. The volume of business is good.

Stillson Wrench Parts.—Walworth Mfg. Company, Boston, Mass., have revised the list prices on Stillson Wrench Parts, taking effect June 1, as follows:

Revised List on Stillson Wrench Parts.

Inch	6	8	10	14	18	24	36	48
Jaw	$0.75	.75	.80	1.00	1.33	2.10	4.75	7.25
Frame	.35	.35	.40	.50	.55	.80	1.30	1.50
Steel handle	.95	.95	1.10	1.45	2.10	3.20	6.40	9.25
Nut	.11	.11	.14	.17	.22	.35	.55	.95
Wood handle	.16	.16	.18	.25	.28	..	..	..

Sheet Zinc.—The price of Sheet Zinc continues to decline, a further reduction being announced under date 3d inst. by Matthiessen & Hegeler Zinc Company, La Salle, Ill., the quotation now being $5.90 per 100 pounds in 600-pound casks, f.o.b. La Salle, with the usual discounts.

Stove Boards.—Owing to the activity of outside competition, prices on paper lined embossed Boards are lower and somewhat irregular.

Cordage.—Demand for Rope continues moderate, and orders cover present necessities only, as on a somewhat weak market buyers are not stocking up. Sisal fiber is lower in price, which will probably result in the various grades of Sisal Rope being ordered to a greater extent. Quotations on the basis of 7-16-inch diameter and larger are about as follows: Pure Manila, 11 to 11½ cents per pound; other grades of Manila, 10¼ to 10½ cents, according to quality; pure Sisal, 9 cents; mixed Sisal, 7½ to 7¾ cents, according to quantity. It is understood that the largest buyers are able to obtain warranted pure Manila Rope at 10½ cents, and A grade at 10⅛ cents per pound.

Paris Green.—The market continues dull, with but little new business. No change has taken place regarding prices, which are as follows: The base quotation of 11 cents in Arsenic kegs or casks is general. Most manufacturers are asking the customary advances, but some are naming less than the regular advances on the smaller packages.

Glass.—The immediate outlook for the Window Glass trade is not encouraging, owing to the continued lack of demand and the fact that many factories have not yet shut down. Prices are not on a solid basis, and low quotations are still being made. It is reported that a leading manufacturer has offered Glass for delivery at any time during 1904 at the present market price. Unless manufacturers and workmen can come to some agreement to promptly put a stop to the production of Glass and to insure a uniform wage scale and a uniform time for closing the factories for the summer months, it appears doubtful that any improvement in the condition of the market will take place in the near future. At the rate which Glass has been turned out by the factories and the light demand, it has been estimated that during the month of April manufacturers accumulated 2000 or 3000 boxes, and probably a larger quantity in May. Glass making generally began with the first of the year, and a large majority of the factories are in operation still, while some factories began Glass making last September, so that the production this fire must have been quite large. Manufacturers are reported as offering Glass from 90 and 2½ per cent. to 90 and 10 and 2½ per cent. discount, according to assortment, and the necessities of factories for cash to carry on their business.

Oils.—*Linseed Oil.*—During the past two weeks demand has been largely influenced by climatic conditions, favorable weather for outside work bringing an increase of orders, which declined in number with stormy days. Demand has been for small lots. Large buyers whose contract orders have run out are also pursuing a hand to mouth policy in purchasing. The market has been somewhat irregular on City Oil, owing to the lower price of State and Western, and on the 7th inst. city crushers reduced their price 1 cent per gallon. Quotations are as follows: City Raw, in lots of five barrels or more, 39 cents per gallon; in lots of less than five barrels, 40 cents per gallon; State and Western Raw, 37 to 38 cents per gallon. Boiled Oil, the usual 2 cents advance per gallon over Raw.

Spirits Turpentine.—During the past two weeks the market has fluctuated with demand, but on account of light buying, purchases being confined to jobbing lots, the price has declined. Quotations in this city, according to quantity, are as follows: Oil barrels, 56 to 56½ cents; machine made barrels, 56½ to 57 cents.

HARDWARE ASSOCIATIONS.

WITH a view to inducing non-affiliated merchants to take up membership in the Michigan Retail Hardware Dealers' Association, Secretary A. J. Scott of Marine City has recently sent out a circular in which reasons are supplied why such dealers should identify themselves with the organization. The front cover carries the inscription: "Just a Moment? Did You Ever Think of These Things?" Inside the "Things" are referred to under such heads as: "An Obstacle That Can Be Overcome," "Results Already Achieved," "Every New Member Helps," "Making Our Influence Felt," "A Few More Benefits," "What We Expect To Do." Attached to the circular is a blank application for membership in the association.

Under the head of "A Bouquet from Indiana," the Minnesota Retail Hardware Dealers' Mutual Insurance Company are sending out a leaflet in which the following letter is reproduced:

NEWBERRY, IND., May 10, 04.

M. S. Mathews, Secretary, Retail Hardware Dealers' M. Fire Ins. Company, Minneapolis, Minn.

DEAR SIR: Your draft for $1,485 came to-day. Please accept my thanks for your promptness. There were three other stores burned out at the same time. The proprietors expressed their sympathy for me, as I was the heaviest loser; and at the same time expressed their apprehensions that my insurance was not "solid" and that I might not get the money. Of course theirs was O. K., being in old line companies. Well, their losses have not been adjusted yet; surely the "proof of the pudding," &c.

Hoping for your success and thanking you again for your promptness and courtesy, I remain,

Yours truly, (Signed) ED. SCOTT.

This will be recognized as an eloquent testimonial to the efficiency and adequacy of Hardware mutual insurance as conducted by several of the State associations, of which Minnesota is the pioneer.

The Hardware Dealers' Mutual Fire Insurance Company of Wisconsin, organized by members of the Wisconsin Retail Hardware Dealers' Association, are energetically canvassing for insurance. C. A. Peck, secretary, Berlin, Wis., advises us that from April 8 to May 22 $100,000 insurance has been written. The company are prepared to write policies for from $500 to $3000.

ARKANSAS RETAIL HARDWARE DEALERS' ASSOCIATION.

THE ARKANSAS RETAIL HARDWARE DEALERS' ASSOCIATION are holding their fifth annual convention this week at Little Rock, the sessions opening on Wednesday and concluding on Friday. A most interesting programme has been provided, and the merchants who are fortunate enough to attend should derive much practical benefit from the deliberations. Among the special subjects which will be introduced to the convention through the medium of papers or addresses are the following:

"What can be done by our members to create a more active interest in association work?" by John M. Pittman, Prescott, and E. E. Mitchell, Morrilton.

"The best method to keep a well established business up to its standard," by Hamp Williams, Hot Springs, and W. M. Graham, Clarendon.

"Business hints in the Hardware line," by C. T. Rosenthal, Batesville, and P. J. Tidwell, Buckner.

"What are the best methods of extending credit and making collections?" by J. L. Davis, Magnolia.

"Best method of keeping tab on credit sales, so as to insure the proper charge," by O. R. McDaniel, Prescott.

"Shall Barbed Wire and Nails be profit makers or leaders with us?" by J. A. Plummer, Marianna.

"Business leaks, and how to stop them," by T. B. Stewart, Newport, and S. F. Palmer, Mammoth Spring.

"What shall we attempt to do in the fiscal year which we are just entering?" a general discussion.

"Catalogue House Competition" will be an important subject of discussion, and formal addresses on this topic will be made by R. W. Shapleigh of the Norvell-Shapleigh Hardware Company, St. Louis, looking at it from the jobber's standpoint, and by M. L. Corey, secretary-treasurer of the National Retail Hardware Dealers' Association, viewing it from the retailer's standpoint. Mr. Corey will also address the convention on "What the National Association is Doing for the Retail Hardware Dealer."

Unlike the Question Box of other associations, which is made up during the continuance of the conventions, the Arkansas Question Box is already in shape, having been prepared by the Programme Committee. The different questions will be presented for discussion as opportunity offers during the convention. Among the questions thus decided on are the following:

Have the trusts injured our business?

Should the Hardware jobber sell to the blacksmith direct?

How do you handle the Mower and Reaper business?

A town has three Hardware merchants; two want to join in association work, but the third man will not. What should be done?

Is there any good reason for patronizing the Hardware insurance companies?

Can a man be a good buyer if he has to buy several lines of goods, as in a general store?

Are freight rates on Hardware in proportion to those on other lines of goods?

Is the demand for commercial fertilizer growing?

Is Glass a profitable line to carry?

Does the seed business belong properly to the Hardwareman?

How often do you have your scales tested?

What is the best way to meet encroachments by jobbers on the retail trade?

Does every member take a trade paper? How many take two? If you don't take one, why not?

Is a cash register sufficiently useful to be worth its cost?

What is your experience in handling the cheap Plow business? Can it be made more profitable? Can it be cut out altogether?

As individuals and as an association, how can we prevent canvassing the farmer trade for Buggy sales by the representatives of some vehicle concern?

What percentage is correct to add to cash price on a sale made in the spring due in the fall?

Is it good policy to buy goods on long time and sell on long time?

What benefits are derived from paying cash, besides the cash discount?

Does any member sell exclusively for cash, or any particular line for cash?

How do you handle the "dead beat" in your town?

If there is no law to force a railroad to deliver goods in a reasonable length of time, is it right that the railroad should be allowed to collect demurrage?

How much do you make by staying away from our State convention? How much do you lose by attending?

The programme offered is thus an exceptionally attractive one, and a very useful and interesting convention should result.

"AMERICAN MADE GOODS."

THE INTERNATIONAL CABLE DIRECTORY COMPANY, 17 State street, New York, publishers of the Western Union Telegraphic Code and International Cable Directory, have just issued a reference book of nearly 500 pages, each 11¼ x 8⅝ inches, entitled "American Made Goods." It is intended for the promotion of export trade, as a ready reference guide and classified list of American manufacturers. The names of the various manufactured articles are printed in English, French, German and Spanish, in parallel columns. The names of the manufacturers, with their addresses, are in English, opposite which in many instances is the manufacturer's code word and name of particular code to which it applies. There are also separate article indexes of the numerous kinds of goods named, in the four languages. The aim of the publishers is to place the book in the hands of foreign buyers, many of whom are at present trading principally with Great Britain, France, Germany, &c.

HARDWARE EXHIBITS AT ST. LOUIS.

WYETH HARDWARE & MFG. COMPANY, St. Joseph, Mo., make a very large and complete exhibit of Harness, Collars, Riding Saddles, Gig Saddles, Whips, Hand Stamped Leather Chaparejos, Scabbards, Rifle and Pistol Holsters, Saddle Pockets, Cuffs, &c. Their patrons are urged to come and make their headquarters at their office in the northwest corner of the Transportation Building, where they have writing desk, easy chairs, toilet and lavatory closets and other conveniences.

L. & I. J. WHITE COMPANY, Buffalo, N. Y., make an attractive exhibit of a full and complete line of their Machine Knives and Edge Tools of the highest quality of workmanship. The exhibit will be found in the Machinery Building, at the extreme southeast corner, next to the southeast entrance. They also make a display of their Coopers' Tools in connection with the exhibit of the Chickasaw Cooperage Company, Memphis, Tenn., space 34, Forestry Building, which shows the different steps in the manufacture of cooperage.

STANDARDIZATION OF TAPS.

THE manufacturers of Taps have reached an agreement which standardizes their complete lines of Machinists' Hand Taps, Machine or Nut Taps, Pulley Taps, Tapper Taps and Machine Screw Taps. The new standard will place the line of Taps on the same plane with that of Twist Drills, and will be, it is expected, a great convenience. The line of Taps had become very complicated, especially because of the demands of the Bicycle manufacturers some years ago, when each wished distinctive pitches for screws employed in his machines.

Under the new standard many of the important sizes are simplified by the elimination of some of the pitches. This is especially true of the Machinists' Hand Taps. For example, in the ¼-inch Tap only 24, 27 and 32 pitches are retained, such sizes as 16, 18, 22, 26, 28 and 30 being eliminated. The 27 pitch is retained throughout the list, because it is the common pipe thread in brass pipe work.

Another important change is the shortening of the Machinists' Hand Taps and Machine or Nut Taps. The amount of shortening varies, of course, with the various makes. All are shortened somewhat. In the Machinists' Hand Taps the ¼-inch is now 2½ inches, the ⅜-inch is 2 15-16 inches, the 1-inch is 5⅛ inches, the 2-inch is 7⅝ inches, and so on. The reduction in length does not apply to sizes below ¼-inch.

The reduction in length is proportionately the same with Machine or Nut Taps. The manufacturers are including the new lists in their 1904 catalogues, from which complete details of the changes may be obtained. However, the new sizes will not be put upon the market until manufacturers' present stocks are exhausted.

THE export business carried on for a term of years at 38 Water street, New York, under the name and style of Successors of E. H. Henriques was owned and solely conducted by Gonzalez-Rubio & Co., and will henceforth be carried on under the latter name, which is that used by the firm at Guayaquil, Ecuador, where the main office is located. William Jones, who for many years has been the manager of the New York office, will continue as such, the change in name being simply to carry on the business under the names of the present proprietors, Felix Gonzalez-Rubio and Carlos E. Hoheb. The house are agents for the sale of all kinds of American goods and were established at Guayaquil in 1878.

THE Hardware store of L. H. & Ernest Crane, at Machias, Maine, was badly damaged by fire on the 27th ult.

THE CATALOGUE HOUSE QUESTION.

ADDRESS BY WILLIAM R. BELKNAP BEFORE THE ATLANTA CONVENTIONS.

OUR readers will enjoy perusal of the address made by William R. Belknap of the Belknap Hardware & Mfg. Company, Louisville, Ky., at the recent Atlanta gathering. The occasion was a notable one, and several of the leading jobbers of the country expressed themselves in regard to the catalogue house question before an influential audience in which Hardware manufacturers were largely represented. In connection with an interesting discussion of the great question under consideration Mr. Belknap touched delicately and suggestively, with blended humor and pathos, on the position of THE OLD MAN IN BUSINESS:

Your chairman has with propriety characterized Mr. Simmons as the Dean of the Hardware business. He might have gone further and declared him *facile princeps*, for we must all thus acknowledge him, no matter what our own rank, in our own estimation even, sectional or national. His presentation of the question at issue this morning seems to me to leave very little to say; he covered the ground fully and conscientiously; we were constrained not only to listen, as we did, but to applaud his points as he made them one by one with admirable distinctness. Of course, we have all been compelled, whether or no, to think a deal about this question. Mr. Norvell has his in book form, but whether one thinker's conclusions are any better than another's we must leave you to judge after you have heard the several testimonials and applied them to your own experiences. One of us may go into the details a little more exhaustively, from his own standpoint; another may treat it from a broader ground of business principle and policy.

As the chairman gave us absolute freedom of range for topics, I had not expected to confine myself to the catalogue house question this morning. I had another one in mind that I thought it might pay to dwell upon for a few moments, and that was the place of the "old man" in business, and by "old man" I do not mean one actually senile and decrepit, but that personage considerably in interest who is credited with having a well developed faculty of detecting errors or of happening on bad breaks, and to whom the culprit sooner or later has to pay his respects. I believed I could treat this latter topic to more purpose than I could the other, because of a certain amount of sympathy based on personal knowledge; mine eyes and ears have not been wholly closed to mine own surroundings, but I will come to that a little bit later.

Catalogue Houses.

I would say for our own company, on behalf of the immediate point at issue, that it has given us concern, because it concerns deeply our best friend—the retail Hardware dealer. It is an open question, however, whether you can by resolutions in meetings, or even through the aid of salaried secretaries, lay off the Hardware world into lots just so many feet front—this one to hold the manufacturers, and this the larger jobbers, and this the smaller jobbers, and this last 10-acre lot the retailers. And, by the way, nature on her part does not attempt so much; her boundary lines are never so sharp. You may be an expert biologist, but you cannot tell exactly where the mineral world ceases and the vegetable world begins, and where the vegetable world leaves off and the animal life begins. We don't know whether a sponge has life in its spicules or whether sea weed is conscious of our touch. And so as to these subdivisions which we undertake to establish among ourselves as to manufacturers, jobbers, retailers—they are more or less artificial; there will always be disputes as to the boundary lines and as to the privileges which are reckoned to pertain thereto.

Do Not Sell Consumers.

Mr. Simmons says he is all three—viz., manufacturer, jobber and retailer, a sort of trinity to which the rest of us may pin our faith. Speaking for my company as manufacturers in one way and as jobbers in another, we do not pretend to sell the consuming trade. In order to make that statement absolutely true, we will say that in the line of Builders' Hardware, where no adequate stock can be carried except by the larger houses, we do have an exhibition room of the finer grades and they are displayed to contractors, architects and their clients, with a view of elevating the taste and encouraging the sale of better goods, but all the time we maintain a reasonable differential in favor of the retail dealer. We seek to do no retail business; we turn it down or over to our correspondent, the dealer in the town. This is our established principle and we do not deviate from it unless we are deceived.

I once heard Bourke Cockran in one of his eloquent speeches epigrammatically define civilization to be the expression of man's most diversified wants; in other words, he declared where we find man's wants the crudest there is barbarism. The savage simply craves food for his stomach, clothing cuts no figure, and provides himself with arms or weapons of offense and defense. Where we find men surrounded with multiplied luxuries, largely the result of suggestion, there is civilization. If we can show a man that he is losing something of the good things in life by reason of not having an implement or tool or utensil which may minister to his home life, to his wife and children's comfort, or if we can display to him something he has not got that he ought to have and persuade him to buy it, we are civilizing him, we are party to his uplifting, we are enlightening him for the benefit of future generations.

Catalogue Houses and the Civilizing Process.

Now these catalogue houses have probably contributed no little to that civilizing process by sending out these millions of cheap books, crammed with illustrations of all sorts of articles that people can use to advantage. The publishers would not show them there if they didn't think so. The children con this or that page; the farmer when he goes home at night may consult it, and his wife has had a glance at it between meals during the day. They find a picture, perhaps, of something that they never saw before, or at least they didn't know how to ask for it, and so they write to the house for this novelty—that labor saver, this decorative article or whatever it may be. That is one way the connection is opened up, and so far as that goes liberal cataloguing, liberal distribution of trade literature, exercises a decidedly beneficent influence.

The Hardwareman's Opportunity.

Now I think we can build, and the retailer can build, on that foundation which these others have laid of new and additional wants, and if the retailer will carry the brighter, the better stock, and call upon his jobbing connection to assist him, maybe only for display purposes for a short time, he will, ten to one, meet with willing response. And I think there will be suggested to us as a possible exit from part of our difficulties an effort on our own part, thoughtful and effective. We must put forth exertion and do something to distinguish ourselves. We shall not be disappointed, either, if we do, because the country is growing larger, wants are multiplying all the time, and, although these catalogue houses have come into the world of traffic and sold a world of goods, there is still a much vaster army of retailers which is selling goods day in and day out, and there is no reason why this disciplined force should tamely surrender. In other words, there are every year more people to buy and each thrifty person has more money than a short time back; therefore the prosperous communities can support more

dealers and storehouses and distributers of stock, just as we can support more railroads, steam and traction, than we could a few years ago. We use them more. Look at the increase of per capita money in circulation. I think I am not wrong in saying that it is about $10 per head more than it was ten years ago.

So if the Retailer Will Sharpen His Wits,

not simply call on Jove to come help him to recover his Axe, or to get his wagon out of the mud hole, but putting his own shoulder to the wheel, recognize his own power, recognize his true and ready source of help and power in his friend, the jobber, there need be no reason for discouragement on his part. Of course, there are obstacles to overcome. There are every year. We do not have to wait for bad years for these to show up. That is a part of the struggle, and without the struggle we cannot cultivate any fiber whatever.

An Antidote for Blues.

It is hard to be pessimistic and give up hope when one reads even the advertisements in the magazines. A neighbor of mine bore testimony to this, who said he would go home discouraged over the outcome of his law cases during the day, and he would turn to magazines and divert himself reading about the marvelous properties of this soap, or that fountain pen; even corset and garter pages were not without their special revivifying influences. They filled his mind with optimism, and he felt sure that the world was coming to the good and not going to the bad. So I am sure the growth of our great Hardware trade journals, with their ever increasing advertisements of the best improved tools, with all the ways devised of classifying them in enticing boxes, which Mr. Warren furnishes, and with our modern office outfits of upright files and loose leaf ledgers convince us that we are not going down grade. If we are, it is our own fault, and because we are not using our resources to their utmost.

Specifics Better Than Universal Cure Alls.

Now, it would be very presumptuous, it seems to me, if any one class of trade, even retailers, undertook to prescribe a wholesale dose for the manufacturers, to say what they should take with or without the proverbial shake to have their systems cleared out and be happy forever afterward. That is not to be; there is no such panacea in the whole pharmacœpia. We each of us have to work such things out. I think if Mr. Simmons would confide in us how to exactly conduct our businesses so they would attain the magnitude of his, while we should doubtless feel flattered by such confidence it would fall short of results without the force behind it. When you see how thoroughly he has treated this subject before us and how well prepared he was at every turn you realize something of the why and how. You get a little bit of an inkling by what he says and the way he says it as to why he is called on first.

Regulating Published Prices.

There is one point, though, I believe, which might be mentioned, and that is the regulation of published prices by you gentlemen of this manufacturing class in these catalogues and in the trade papers. That I think is entirely within your scope to regulate. What a man sells and how he sells it is, of course, difficult to control, but any man who has a well-known trade article sold under his own name and brand can see to it that the published price in these widespread catalogues shall not be destructive. It must not be, at any rate, lower than his own restrictive price, which he places upon the trade wholesale, and yet we have often seen just that thing done—a price in print which violated the agreement. That is about the most disturbing influence we have to deal with.

A Hint for Live Retailers.

I think possibly an anecdote of an actual experience of a friend of mine with a catalogue house might not be out of place. He wanted a pig ringer. He wrote to Chicago and had it come down by mail, and the first time he put it to use broke it. I said, "Did you write back about it and complain?" He said he had, and they replied the price was very cheap, and the tool was not expected to stand much strain. I said, "Why didn't you go to your dealer in town here and get a good one that will be guaranteed?" "Well," he said, "it was 4 or 5 miles drive through the mud, and then it was much easier to write the letter than to stir off the premises." Now that is something that has to be contended with. The rural free delivery and the parcels post is making it easier to shop that way. We cannot blame the people, for ofttimes it is easier to order from the catalogue than to harness up and go to shop in person at the cross roads. The retailer, too, must get into communication with people who use things, and make it as easy for them to get an article from him as from the catalogue house, whether new or old. We cannot expect the consumers to overcome too many obstacles of that kind just out of loyalty, although loyalty does go a long way.

There are, however, others here in this meeting who can speak more forcibly on the catalogue house question than I. Those, for example, in charge of the sales departments who meet these disturbing elements every day; and those who have to do with the traveling salesmen, who hear and convey more or less complaint about it as they go up and down their respective routes. We must do as Mr. Simmons says he does, through the salesmen, endeavor to stimulate the country dealer; to build up and to encourage wherever a retail house is already established the feeling of independence and ability to cope with any emergency whatever.

Hardly anything gratifies us more than to think that we stand *in loco parentis*, or in the more modest position of school teachers, to the trade. We want to graduate periodically or by continuous performance a large class of progressive sales people throughout the country who are resourceful and earnest, and if we can instill into them the approved methods of doing business, thus reducing the worry of fictitious claims and returned goods to the minimum, we can count on a higher sense of honor to prevail, and our pathway day by day will be comparatively rosy.

The "Old Man" in Business.

Now, in regard to the subject matter proper: If you are manufacturers, I don't know that you have the same thing to contend with. This creeping sensation of being gradually pushed back a little further from the front door, out of the active arena and into the quiet. Possibly some of these wonderful well-points of yours have been driven into the fountain depths of perpetual youth—it might well be so as I see it from this platform—but to one whose head has grown gray while he has endeavored daily to steer between the Scyllas and Charybdises of the Hardware sea, to him the question of increasing years is one that gives him pause. It comes along with later life, when he begins to realize that a younger and more vigorous mind is able to administer some section of the business better than the "old man," albeit it were this latter's own special care hitherto. He has to acknowledge this little by little as one achievement after another, characteristic of youth, marks success where the older head might have shaken disapproval or doubt and the older foot have halted.

And it comes, too, with an insidious tender solicitude for his comfort and welfare which touches him deeply, though he pretends to ignore it. It comes with an easy chair and possibly a sofa against the wall. In vain he may select the hardest seated, stiffest backed seat—he finds the softer one pushed in his way deferentially. The office porter gives his furniture an extra rub, and spares him all the unnecessary noise. Clatter seems to subside more or less with his presence and he is looked on as an easy mark where promotions or raising of salaries are concerned. Every now and then he spruces up with a smart hat and a bright colored tie—all to little purpose; the boy with the puffy shirt waist and striped socks is ahead of him there, and the very afternoon when he thinks his services most necessary to close up inventory or to pass on the month's statements he is recommended to betake himself to the golf links. No use to imagine his importance, somebody else does it better, and he is cautioned not to exert himself too violently or too long at a time. And there is a little resentment at this, because it cuts

him out of just what he most prizes—a more intimate association with you gentlemen in the seats of the mighty to-day.

'Way Back.

A few years ago he saw every traveling man and the notable head of the house, some chairman or president or secretary, who made an occasional round, and he had the privilege of inviting these dignitaries to drive or lunch. Now he is back—'way back—at the barred window, figuring the ratio of expense to sales or at some such work which is very dry compared to the bulletin of news from the front which the traveling salesman brings. He misses his good old friends when they come around, and only knows they've been here when they're gone. Just how to encourage or lure these gentlemen to the extreme rear of the building is a question. Possibly it can be referred to the manufacturers here to-day in executive session. We jobbers always wonder anyhow what you do in executive session. Tell us, please, just what place is best for the "old man" to occupy in the store or office and not lose the run of business. This is important, but to occupy the new position and not lose the run of friends, that is more important. Possibly a sign hung out in front, similar to the ones we used in the East warning away beggars, peddlers and book agents, might be reversed, if we could hang it where all visiting salesmen and consulting presidents, new and old time customers, could see it, especially inviting them to the back office, where the "old man" sits—some such device as that to overcome this ever increasing distance. How can it be done? If any gentleman on your side of the house will enlighten us who are getting along in years, we shall surely be obliged to you.

ROCK ISLAND PLOW COMPANY AND CATALOGUE HOUSES.

The Rock Island Plow Company, Rock Island, Ill., issue a pamphlet entitled "WHO'S YOUR FRIEND," which is about evenly divided between references to their goods and matter relating to catalogue houses and their methods. The company assume that the retail dealer has been and will continue to be the basis of the commercial system of the country, and regard catalogue house methods as tending to disturb established channels of distribution and interfere with industrial prosperity. The following extracts indicate some of the ways in which the subject is treated:

> No mail order house helped to build the little white schoolhouse in your district or turnpike the road past your door. No mail order house ever took you by the hand when you were in distress and told you to let that little account go until after harvest next year. No mail order house ever sold you a machine and then spent every cent of its profit right in the community where you and your neighbors could get it all back again. No mail order house ever shoved its patent leather shoes under your table and rejoiced with you when you were glad, nor spoke encouraging words to you in affliction, nor stood with uncovered head beside the grave when your children died.
>
> All the mail order houses in christendom wouldn't increase the value of your farm a cent. They are parasites, to whom life is only possible so long as they can suck blood out of communities, to the upbuilding of which they contribute nothing.
>
> Your local dealer needs neither advocate nor defense. His methods rest upon principles that have built up in this country a system of internal commerce which is the marvel and admiration of the world. His business is legitimate because its success contributes to the general prosperity of the community that built it up.
>
> Your local dealer stands ready to duplicate every offer so seductively set forth in the catalogues of mail order houses, and more. He will trump the best trick the mail order house ever played if you will put down spot cash and accept from him a class of goods devoid of respectable ancestry, and upon which no reputable manufacturer will place his name.

The company advise us that the booklet has been extensively circulated among farmers and the reception given it indicates the manner in which this class of persons respond to appeals of this character. They express the opinion that if dealers will inform themselves as to the best methods of meeting catalogue house competition, and will co-operate with manufacturers who are willing to take the initiative, the problem will work out to a point where no live dealer need fear for his trade.

BELKNAP HARDWARE & MFG. COMPANY'S CIRCULAR LETTER TO THEIR CUSTOMERS.

Under date of May 24 the following circular letter was sent out to their customers by the Belknap Hardware & Mfg. Company, Louisville, Ky. It indicates, it will be observed, that the company are determined to adhere to their policy of not selling catalogue houses:

The catalogue house question lately brought into unusual prominence, the situation would seem to call for an expression from those who are confessedly most interested in maintaining the position and prosperity of the retail dealers.

We have always counted ourselves in this class and our position has been unmistakable, for, although solicited to do so,

We have never sold catalogue houses,
We are not selling catalogue houses,
We do not intend to sell catalogue houses.

Moreover, we have believed that the retail dealers, as soon as they recognized the emergency, would prove themselves fully able to cope with it, and the discussion which is going on ought to be eventually of great benefit to the trade at large. We believe that it will accomplish the following results:

1. A better understanding between the retail dealer and the jobber, and an implied compact between these two for mutual protection and benefit.

2. That it will stimulate the retail dealer to carry larger and fuller lines and keep store in better style than ever before, drawing on the jobbing stocks more liberally, in order that his customers may not be diverted by ephemeral catalogues whose illustrations and quotations may mean something or nothing.

There is no comparison in satisfaction to the customer and consumer between ordering from one of these frequently misleading catalogues and actually handling the goods which are desired.

We believe that we were the pioneers in this movement in refusing to sell catalogue houses, realizing the danger to our friends at the first appearance. We beg leave to assure you that our policy has not and will not be changed. We recognize our friends in the retail merchants and invite their confidence in any phase of this vexing contention.

A Board to Adjust Prices.

FROM A MANUFACTURER IN NEW JERSEY: In all the articles upon the catalogue house question I have failed to see any plan suggested whereby the burden of adjustment could be evenly distributed between the parties in interest.

Two plans seem to be suggested: To boycott those manufacturers that sell to catalogue houses and to have retailers reduce their prices. Good customers are not so plenty as to make it likely that manufacturers are going to throw down those that they have, and I am not aware that the average retailer is amassing wealth any faster than he should.

I believe the following plan, if properly understood and elaborated, would be just to all and would settle this and many other vexed questions: Let all manufacturers who are willing to do so agree to sell only through an association or board, selected by all the parties in interest. Let those jobbers and retailers who concur agree to buy only from this board or association.

Let the board adjust prices for manufacturers, based upon cost, and fix prices for jobbers and retailers and for catalogue houses. It could easily be made to the interest of all concerned to join such an association. It would take the place of trade agreements, combinations and pools. Wholesale orders would command wholesale prices and retail corresponding ones.

This proposition will test the good faith of those who are loudest in this discussion. Are the jobbers ready to give good orders when they expect best prices, and are the retailers prepared to sell at a fair profit? If they are not, and this agitation is simply designed to frighten

some of the manufacturers who are selling to catalogue houses, then the sooner it is brought to an end the better.

Meeting Catalogue House Competition.

FROM A HARDWARE MERCHANT IN WISCONSIN: This catalogue and mail order business is a tough proposition. I think manufacturers should look the ground over, and if they conclude that the catalogue houses will bring them the largest distribution, let them market their goods through these concerns. I think the jobber is in closer touch with the consumer through the retailer, and have found it the case that nearly all of the jobbers that solicit trade through this section refuse to sell to the catalogue houses. I think the better way to handle this matter is through the friendly relations with the consumer, showing him that he can do as well by purchasing at home, by keeping a good assortment, properly displayed, and, whenever possible, on the same quality of goods quoted by catalogue houses giving him the same price, freight added, which I think the average retailer will do if given a chance.

Competition from Jobbers.

FROM A MERCHANT IN ALABAMA: I note that catalogue houses have been given considerable attention of late by jobbers. While we have suffered to some extent in this section from that source, our real competition has been from the small jobbers who sell our trade and then solicit business from us. By some means they get better prices than retailers who buy in car lots, and the competition is gradually ruining the retail trade. I know of no way to prevent it.

IMPORTANT DECISION.

THE trade will remember that a decision was rendered some time ago in the suit of the Enterprise Manufacturing Company, Philadelphia, against Landers, Frary & Clark, New Britain, Conn., in favor of the plaintiffs and restraining the defendants from manufacturing or selling certain patterns of mills substantially the same in appearance as those of the plaintiffs. The case awakened a great deal of interest in view of the frequency with which Hardware articles of one manufacturer have been imitated by other manufacturers, as well as the important legal principles involved. Many expressed the opinion that the principle laid down by Justice Platt in the decision in question would be overruled on appeal. This, however, has not been the case, as in the United States Circuit Court of Appeals, Second Circuit, Justices Wallace, Lacombe and Townsend, have affirmed unequivocally the decision of the lower court. In view of the importance of the subject we give the text of the decision, which was written by Justice Lacombe:

This cause comes here upon appeal from a decree of the Circuit Court, District of Connecticut, restraining defendants from unfair competition in trade and for an accounting. Complainant and its predecessors have for 30 years been engaged in the manufacture and sale of a line of mills for grinding coffee, drugs, &c., of varying sizes, adopting therefor a certain characteristic shape, design, color and ornamentation, which have become well known to purchasers and associated in their minds with the goods of complainant. In 1898, or thereabouts, the defendants began to make and offer for sale similar mills, and upon discovery thereof this suit was brought.

This is a most aggravated case of unfair trading. Usually in these cases, the defendants so dress their goods as to present a number of points of difference on which they rely when charged with intent to deceive, insisting that, although there may be resemblances, the differences are so great as to preclude any idea that they had sought to produce confusion. Here, on the contrary, they have not only conformed their goods to complainants' in size and general shape, which was to be expected, but also in all minor details of structure, every line and curve being reproduced and superfluous metal put into the driving wheels to produce a strikingly characteristic effect, while the goods are so dressed with combinations of color, with decorations reproduced or closely simulated, with style of lettering and details or ornamentation that, except for the fact that on the one mill is found the complainants' name and on the other the defendants', it would be very difficult to tell them apart. It is elementary law that when the simulation of well-known and distinctive features are so close the court will assume that defendants intended the result they have accomplished, and will find an intent to appropriate the trade of their competitor, even though in their instructions to their own selling agents they may caution against oral misrepresentations as to the manufacture of the goods. There is evidence to show that purchasers have been deceived as to the identity of these mills, but in the case of a Chinese copy such as defendants offer to the public such proof is hardly needed.

It is to defendants' credit that when confronted with the charge of copying they have not denied it, nor asserted that they were trying to differentiate their own products. On the contrary, they admit that they "concluded they could profitably manufacture this same line of Hardware and sell it in competition with the Enterprise Company," and accordingly commenced the manufacture thereof, "using parts of mills sold by the Enterprise Company as patterns wherever it was convenient or profitable to do so," with the result that they are "now making and selling Coffee Mills which in all substantial respects, and especially in their effectiveness in use and *attractiveness, are the same goods* as those made and sold by the Enterprise Company."

No doubt with such identity in attractiveness, competition with complainants' mills would be much more effective, but defendants overlooked the fact that a court of equity will not allow a man to palm off his goods as those of another, whether his misrepresentations are made by word of mouth or, more subtly, by simulating the collection of details of appearance by which the consuming public has come to recognize the product of his competitor.

The decree enjoined the sale of mills of seven sizes which had been already offered for sale; and further enjoined the sale of "any grinding mills having the characteristic shape, design, color and ornamentation of the grinding mills sold by complainant, and referred to by the numbers 0, 1, 2, &c." (Giving 15 numbers.) Although there was no proof of any sale of mills corresponding in size to these numbers, the decree as to them was warranted by the answer, which avers that "defendant also intends to make other mills which will be substantially the same goods as other classes of mills made and sold by the Enterprise Company."

The decree of the Circuit Court is affirmed with costs.

REQUESTS FOR CATALOGUES, &c.

The trade are given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

REQUESTS *for catalogues, price-lists, quotations, &c., have been received from the following houses:*

FROM KOKOMO HARDWARE COMPANY, Kokomo, Ind., who have been incorporated with a capital of $20,000, to carry on the wholesale and retail business in Shelf and Heavy Hardware, Stoves and Tinware, Grates and Mantels, Paints and Oils, Sporting Goods, &c.

FROM THE CLAIBORNE HARDWARE COMPANY, Port Gibson, Miss., who have been incorporated with a capital stock of $25,000 and expect to engage in business about July 15.

FROM E. L. JONES & CO., who have purchased the Hardware, Stove and Paint business formerly conducted by J. A. Weaver & Son, Omaha, Neb.

FROM GEE HARDWARE COMPANY, Lakeview, Mich., who request catalogues and quotations pertaining to their different lines, including Hardware, Stoves, Farm Implements, Sporting Goods, Paints, Buggies, &c.

FACTORY COST AND BUSINESS METHODS.

ENCOURAGING EMPLOYEES TO MAKE SUGGESTIONS.

Continuing the discussion in regard to encouraging employees to make suggestions, a matter which was touched upon in THE IRON AGE *May 5, in which the practice of some manufacturers in this regard was described, we give the following letters from manufacturers who refer to their experience and methods:*

From the T. B. Laycock Mfg. Company, Indianapolis, Ind.: We have for several years awarded prizes to our employees for suggestions offered by them and adopted by our company. We are continuing this policy, and feel that we are amply repaid for our trouble in carrying out the same, as well as for the money expended in this way. For some years we had a list of prizes running from $1 to $2 and aggregating about $75, which we awarded twice a year—the last of June and December. For the last two or three years we have awarded to those

System of Prizes

Encouraging Suggestions from Employees.

whose suggestions have been adopted sums of money commensurate with the value of their suggestions, there being no limit to the amount subject to award. This plan has worked admirably, and many important suggestions have been received and adopted, and some very liberal amounts have been given in return.

Automatic registers are located in prominent places in various parts of our works; these are supplied with triplicate rolls of paper with carbon between. The employee wishing to offer a suggestion or file a complaint writes it on one of these registers. Tearing off two of the slips, one (the original) is put in an envelope addressed to the Advance Department, and the carbon copy (the duplicate) is kept by the suggester; the triplicate is left in the machine. The receipt of these suggestions is acknowledged with a letter of thanks. All suggestions are passed upon by a board consisting of the officers, managers, superintendent and master mechanic.

Registers for Suggestions

Our employees, as a whole, do not take as great an interest in this feature of our work as we had hoped they would. There is, however, quite a large percentage of them who do and who are offering suggestions from time to time. It is possible, especially in a line of work like our own, that there is a limit to the progress that may be made in the way of equipment, and it is possible also that we may have approached closely to that limit. There are always opportunities, however, for improvement in the line of goods one manufactures, and we think that ours is no exception to this rule.

Many Suggestions Made

Taking it altogether, our experience along this line has been such that we are well pleased with the progress we have made in following out the policy above outlined, and believe that it has been of very great assistance to us in working out a system, a management and an equipment for us that we think is unsurpassed, in our line, in this country. We say this because we believe it to be a fact, and do not mean to say it in a boastful way.

Experience Very Satisfactory

From an Ohio Manufacturer: Referring to the article in your issue of May 5, "Encouraging Employees to Make Suggestions," we believe this system has worked very satisfactorily wherever it has been given a fair trial. While we have not followed it up as we would like to do and intend to do later on, we have tested the matter sufficiently to demonstrate, beyond any question so far as we are concerned that it is a very desirable plan to pursue.

Very Desirable

The simple fact that it starts a discussion on the subject of improvements and changes in a factory is bound to bring about some benefit to the plant. Many suggestions, in fact most of them, would be impracticable from the manufacturer's point of view, but a very encouraging part of the suggestions would be used to advantage. A small amount invested in the way of premiums is more than paid in the improvement that results from having employees think something about their work and whether it can be done better in the future than in the past. Employees receive a direct benefit in that many of their suggestions tend to relieve them of unnecessary work without increasing the expense of doing it, so that by following up suggestions of this kind the employer and the employee are greatly benefited.

Mutual Benefit

We regret that our experience has not been of sufficient duration to offer any suggestions that would be valuable or helpful to other manufacturers, as we feel quite sure from our observation and experience that the plan is an excellent one to follow.

From a Large Manufacturer in the Central West: We have experimented to some extent with offering prizes for suggestions made by our employees. About three or four years ago we placed small boxes all through our factory and invited our employees to drop suggestions of any kind into these boxes. At the end of every six months we were to distribute among them $100, divided in portions, varying according to the suggestions received from them. For the first six months, while it was a novelty, our employees took hold of it very well, although the suggestions which we received were of no very material value to us. However, we felt well satisfied in distributing the money among them, but since the novelty of the matter has worn off our employees seem to take no particular interest in it, and it has practically died out entirely. However, we encourage our employees to make suggestions to us in different ways and are very particular indeed to give any employee, no matter what position he may hold, an audience at any time, and from time to time we reward an employee with a cash consideration for a suggestion he may make.

$100 Every Six Months

It just happened that the writer took occasion to reward one of the employees this morning on account of his taking enough interest in our work to tell us of having noticed in one of the Sunday papers that a receiver had been appointed for one of our customers. This man is employed in one of our warehouses and happened to

Interest Rewarded

notice a shipment to this customer being loaded in one of the freight cars.

While, as we said before, we make no specialty of distributing prizes of any kind, we believe most heartily in encouraging employees to take an interest in the business.

BRITISH LETTER.

Offices of *The Iron Age*, HASTINGS HOUSE, NORFOLK ST., LONDON, W. C., May 28, 1904.

The Week's Hardware Trade.

So far as the factories are concerned, some have worked two or three days, and some have been closed down for the week. The home trade has, of course, been at a standstill owing to the Whitsun holidays. The shipping departments are, however, busy above the average. South Africa is still dull and disappointing, but shows some improvement on the early part of the year. Argentina and the South American Republics are at the present time unusually good customers for all manufactured products. India is buying large quantities of Railway and Irrigating Material, as well as Galvanized Sheets. Orders from Europe show some improvement. There is some contraction of Australian demand, but on the whole there is no cause to complain.

Some Sheffield firms having business connections with the British Colonies and South America are fairly active, and have thus been able to make up for the diminution of the home business, while others who are wholly dependent on the home trade find competition keener every month and the conditions of trade all round more exacting. In these circumstances there is a tendency to cut prices, and there is a good deal of this kind of thing going on at the present time in Sheffield.

A Co-operative Smash.

An event of unusual interest this week has been the announcement of the failure of a large co-operative society at Mexborough, near Sheffield. It is rare for a co-operative store to fail; therefore the facts are worth attention. The society has been established for upward of 35 years, and so great was the confidence in it that the people of the district, principally the working classes, invested their savings in it. The society's committee and officials have been drawn from the ranks of the working classes. Some time ago a rumor gained currency that the society was insolvent, but a reward for the author of this statement had the effect of stopping the rumor and renewing confidence in the society; so much so that since then numerous investments have been made. The share capital held by investors was £9000, and all this has gone. A statement of the affairs of the society made by a professional auditor shows that the liabilities are £22,000 and the assets £15,000. Although the last balance sheet contained no trading liabilities, these are now returned at £5000. The assets were, in the balance sheets, overestimated and the liabilities greatly underestimated, and by this means the shareholders were kept in ignorance of the real condition of affairs.

The position of the society was discussed a few days ago at a protracted meeting of the shareholders. A resolution was submitted proposing that the Mexborough Society be handed over to the Barnsley British Co-operative Society, and this was carried. The professional auditor called in made some very strong remarks upon the society's books and upon the balance sheet issued five months ago. The deficiency, roughly speaking, was £10,000.

The ex-secretary throws responsibility on the committee, and says that he has lost £500 in the society. He attributes the failure to bad management and the inexperience of the committee. He received 13 shillings per week for doing all the secretarial work, and for that he did as well as he could. But he had his living to earn and could not afford to devote more time than he did to the work of the society. An experienced man should have been appointed and paid a proper salary. The society's downfall started from the time when it launched out into new buildings without an increase of income to justify it.

British and American Lawn Mowers.

The question of British *vs.* American Lawn Mowers continues to be acutely discussed by the British retail trade. Thus, at a meeting of the Liverpool Ironmongers' Association held this week the inevitable Lawn Mower question came up. Great anxiety was evinced by those present to show that they supported British manufacturers effectively. One of the delegates, in order to get all the facts properly, had had cards printed and circulated among the delegates to the Ironmongers' Federated Association, asking them to state how many British and how many American machines they had in stock. The result of the inquiry seems to show that the ironmongers push the British Lawn Mower as against the American. Fifty-three cards were sent in, and it was shown that the signatories held 600 British machines, as against 130 American. As to the capital involved, the price of the British machines would be from £2 upward, while the highest priced American machine would be about £1 5s. and the lowest 8 shillings 4 pence.

The Standardization of Water Fittings.

A movement which may lead to important results has just begun in this country for the standardization of Water Fittings. A circular has been sent out by the joint Committee on Water Regulations (Adelaide Buildings, London Bridge, E. C.) stating that a subcommittee has been formed for the purpose of considering the standarization of Water Fittings. The committee held a preliminary meeting on April 22, and it was decided to notify manufacturers of Water Fittings to appoint representatives to act on the committee. No organization exists at present representing the manufacturers of Water Fittings of Great Britain, so that it will be necessary to get a very large representation of these manufacturers upon the committee in question. If American makers with any connection in this country have anything to say upon the point, now is the time for them to let their opinions be known.

German and American Trade in Natal.

The following figures are exceedingly interesting as showing the relative strength of German and American trade in Natal. As a considerable quantity of the goods here quoted would go up to Johannesburg, it is in its way an indication of the relative strength of the two countries in the Transvaal as well. The figures are for the year 1903:

	Germany.	United States of America.
Agricultural Implements	£12,200	£65,700
Bicycles and Tricycles	5,000	3,000
Brushware	4,000	2,000
Earthenware	12,500	1,100
Electric Fittings	5,000	6,000
Fencing, Iron	4,400	12,800
Furniture, Upholstery and Floor Cloth	31,000	48,000
Hardware	30,000	65,000
Ironmongery	3,200	8,400
Iron and Steel:		
Girders	3,000	7,000
Rivets and Bolts	200	3,300
Wire Netting	1,600	.....
Railway Material	17,800	1,000
Nails	4,000	5,700
Lampware	6,300	6,100
Machinery:		
Agricultural	200	4,000
Electrical	15,000	24,000
Mining	76,000	6,500
Other	22,000	45,000
Dutiable	7,500	15,600
Oilman's Stores	800	9,400
Plate and Jewelry, &c	5,500	5,000
Sewing Machines	4,600	2,500
Stoves	4,000	14,000

SOME of the uses to which Band Saws are put for getting out lumber in the locality in which it is grown were demonstrated earlier in the season when at Tuolumne, Cal., a section of a large tree was sawn into lumber for the St. Louis Exposition by the West Side Lumber Company of that place. Some idea of the size of the log may be inferred from the fact that the cut was 16 feet long by 6 feet 10 inches wide, the section of log being only from center to circumference. The Saw used was one of Henry Disston & Sons' 13-inch wide Band Saws, which had been worn down to 12 inches wide.

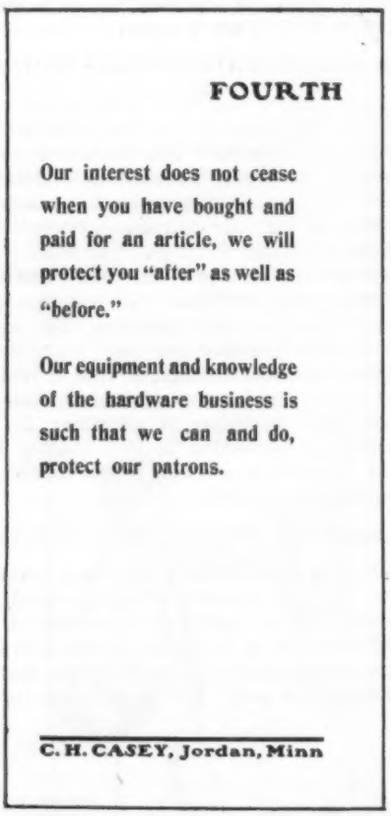
TRADE WINNING METHODS.

This department is for the description of approved methods of carrying on and extending business, and a cordial invitation is given to merchants to co-operate in the effort to make it suggestive and of practical use to the trade.

A MINNESOTA BOOKLET.

C. H. CASEY, Jordan, Minn., has recently issued a booklet, a page from which, reduced about one-third, is reproduced herewith to give an idea of the style followed. The title of the booklet is "Well Defined Reasons for a Share of Your Business." It is addressed "to the man

How Made Up and Used


FOURTH
Our interest does not cease when you have bought and paid for an article, we will protect you "after" as well as "before."
Our equipment and knowledge of the hardware business is such that we can and do, protect our patrons.
C. H. CASEY, Jordan, Minn

Page from Booklet, Reduced About One-third.

who is to buy anything, and particularly to the man who has previously announced his intention of doing so, and who is being importuned on every hand." Mr. Casey's "Reasons," as set forth in the booklet, in addition to the one specially reproduced above, are as follows:

A stock complete and well assorted in every detail.

The careful selection of the good from the bad.

The close buying of each item, that we in turn may offer the best at the lowest prices.

A well kept, clean, bright store, free from dust and dirty corners.

A systematic arrangement of stock, showing our customers all of any particular line, in the shortest possible time. Goods kept from being shoddy or shelf worn.

Instant and courteous attention given every customer, no matter whether a small or large buyer.

Business left in our care, or repairs ordered through us, never neglected.

When we hear of business we are after it, proprietor, clerks and the boy. We pull together. We know that to get and hold business means "pull together."

When we get business it's "attention" to fill our patrons' wants in the most satisfactory way we know how—and we know how.

A systematic and correct set of books, kept right up to the minute. No annoyance to OUR customers on the score of incorrect accounts.

All our time and every iota of ability given to the conduct of our business.

Money or sleep have not been spared to get in shape to care for the wants of our friends, in our lines.

In addition, the booklet contains an enumeration of the numerous lines of merchandise carried in stock.

Mailing List.

Mr. Casey's mailing list is designed to contain the name of every taxpayer or purchaser of goods in his line in the territory to which he caters. This list is again divided into classes, such as farmers, mechanics, threshermen, &c., and there are also lists of people living in his town and in the country adjacent. In this way, when sending out printed matter of interest to a certain class, it is mailed only to such parties. The booklet above described was intended to interest any one into whose hands it should fall, and consequently it was mailed to the complete list. Mr. Casey believes that through the mails is the only satisfactory method of getting this kind of advertising into the hands of the public.

TRADE ITEMS.

JOHN S. LENG'S SON & CO., 93 Reade street, New York, have bought the entire stock of Bicycle Sundries formerly carried by the M. Hartley Company, 313-317 Broadway, and have consolidated it with their own complete stock of Bicycle and Automobile Accessories and Sundries at 93 Reade street. This is the latest of absorptions that have been going on for some time through the taking over of similar businesses and stocks by John S. Leng's Son & Co., not only of concerns in New York, but also as far West as Pittsburgh, Pa. This enables them to furnish many Cycle parts for wheels in use needing repairs that might not otherwise be obtainable, as well as assembling under one roof a very large and diversified stock of such goods.

THE DICKE TOOL COMPANY, Downer's Grove, Ill., have bought from the receiver of the Buckley-Hart Mfg. Company, Detroit, Mich., the good will, patents and patterns of that company's full line of Crescent Wolverine Sprinklers. Although the Dicke Company obtained possession of these Sprinklers late in the season, they are doing their best to fill orders promptly, and will accumulate a large stock for next spring's trade.

SECRETARY EDWARD A. FREEMAN of the Sessions Clock Company, Forestville, Conn., was presented by the employees of the company with a gold watch chain and charm, Tuesday, May 31, as a token of their esteem and good will.

J. E. HAVILAND, formerly of the house of Warner & Haviland, 23 Warren street, New York, has severed his connection with that concern, and has associated himself with Benjamin S. Alder, manufacturers' Hardware representative, 37 Warren street, where he will be pleased to serve his customers and friends as in the past.

GUY I. WATT disposed of his Hardware and Stove business at Independence, Kan., several months ago, his successor being A. L. Patridge. Notwithstanding Mr. Watt has been receiving daily much in the way of printed matter which would perhaps interest him if he was still affiliated with the retail Hardware business. He calls attention to the fact that this matter is wasted, so far as he is concerned, and suggests that his name be removed from the mailing lists of the houses who are thus favoring him with such literature. Mr. Watt is now connected with the Surety Oil, Gas, Brick & Mfg. Company, of which he is vice-president.

FRANKLIN E. SNOW, treasurer of Wells Bros. Company, Greenfield, Mass., accompanied by Mrs. Snow, will sail on the "Ivernia" from Boston, June 7, to spend the summer in Europe.

PATRICK H. HORAN, inventor of a Bread Baking Oven and a man well known in Hardware circles, died at his home in Boston, Sunday, May 22.

HENDRICKS & CLASS, 25 West Broadway, New York, manufacturers' agents for Heavy Hardware, Hardware Specialties and Ship Chandlery, Railway and Dock Build-

ers' Supplies, are distributing a small eight-page booklet, entitled "Progress in Plowing," which explains the merits of a new device called the Wonder Plow Truck, made by the Wonder Plow Company, St. Clair, Mich., designed to make much easier the process of plowing. Hendricks & Class are the export representatives for the company.

J. B. CARROLL has moved his office into his factory building at 136 Lake street, Chicago, Ill., in order to better care for the increasing demand for the Hahn Acetylene Burners.

Letters from the Trade.

Our readers are invited to discuss in these columns questions of trade interest connected with the manufacture or sale of Hardware. We shall be pleased to have a free expression of opinion on subjects deserving the attention of Hardware merchants and manufacturers.

Gave Up Use of Trading Stamps.

FROM A MERCHANT IN MASSACHUSETTS: We discontinued the use of trading stamps because we felt we did not have sufficient extra trade to warrant the heavy cost of the same. One bad feature was that some of our customers were really provoked when they paid their bills to think that we did not give them stamps. In some instances we lost their trade. Then our competitors would watch our prices and undersell us a few cents, with the remark, "We can sell cheaper because we do not give stamps." So we concluded to return to the only correct way of doing business, by buying our goods as cheap as possible and selling them at an advance over the cost without stamps or any other scheming device.

The Band Wagon Cartoon.

FROM A NORTH DAKOTA HARDWARE MERCHANT: I noted with a great deal of pleasure the cartoon in your issue of May 19. It certainly illustrates what I hope will become of the catalogue house in the near future. From the continued agitation that you are keeping before the public, you certainly are making both manufacturers and jobbers think of conditions as they are and it will give them an opportunity to get into the band wagon or keep off, as they think best for their individual good.

The controversy has certainly brought out some letters from prominent Hardware jobbing houses that have been loath in the past to come out in print in any way showing their position relative to the retail Hardware dealer's welfare. If the manufacturers would only be loyal and do as they should, and protect both jobbers and retailers, our paths would be much brighter than they are, and I hope that they can see it to their advantage to give us this protection, which we think we are entitled to.

Economy in Making Catalogues.

FROM MERCHANTS IN WEST VIRGINIA: Where is the jobber who has not spent a considerable portion of his time devising plans to economically catalogue his goods, and do it in a manner that would be intelligent both to his customers and his traveling salesmen? Then, when he is saying to himself, "Take thine ease; thou hast catalogued sufficient goods for many years," he is startled by a salesman from some enterprising factory showing him a new article that appeals to his judgment as being useful, and one that his trade should have. He realizes that his sales will not be extensive, for it is an article that does not sell in quantity, yet it would add something to his profit account. But the expense of getting it illustrated in his catalogue is more than the returns for a good many months, and so he concludes "not to take it up at this time."

Why cannot this expense be done away with? How can it be done? By using loose leaf binders for our catalogues, and all manufacturers adopting a standard size sheet and quality of paper for their printing. Then they could furnish the jobbers with the necessary number of sheets at a cost which would be nominal, and nothing as compared with the present system of furnishing electrotypes and each jobber printing a distinct form for himself at great cost.

One may say that even if this is a saving he is not benefited, for it saves for his competitors and all alike. If so, then it does not need any further argument to prove its right to adoption.

The jobber is the natural distributor for the manufacturer, but he is cut out of his natural position many times for the simple reason that the present system of getting goods before the trade is laborious and expensive, and the end will not justify the means.

"The survival of the fittest" is an inexorable law that will continue until the end of time, and if the jobber sees day by day his glory departing and his horizon growing smaller, and he is to remain in his position as the distributor for the manufacturer, he must demonstrate his right by introducing economies and methods which are effective. His success alone will prove his right to be recognized as the natural outlet through which the manufacturer must distribute his goods.

I have said but little about the manner of putting into general use the system of cataloguing, as this is an after consideration.

AMONG THE HARDWARE TRADE.

The Rogers Hardware Company, Limited, have succeeded Dodd & Rogers, Charlottetown, Prince Edward Island.

H. H. Wilke has lately embarked in the retail Hardware, Stove, Tinware and Sporting Goods business at Horicon, Wis.

Jones & River have sold out their general Hardware business at Bowling Green, Ohio, to G. W. Loomis & Co.

John A. Graham has bought the business of the Manatee Hardware Company, Bordentown, Fla., which will be continued under the management of R. C. Trimble.

The Schell Hardware Company, Connellsville, Pa., have been chartered at Harrisburg, Pa., with a capital of $60,000. C. D. Schell of Connellsville is treasurer.

W. S. Thomas has purchased his partner's interest in the firm of Lichty & Thomas, Iowa City, Iowa, and will continue under his own name at the old stand. W. D. Lichty has retired from the Hardware business. This firm was organized January 12, 1886, succeeding Pryce & Schell, who began business in 1876, Messrs. Lichty and Thomas having been in the latter's employ for a number of years.

Hawes-Owsley Hardware Company, Elberton, Ga., will commence business about July 1. The company are fitting up their store with Warren's fixtures, shelving, &c., and will have an especially attractive establishment. They will carry a stock amounting probably to $20,000 worth of goods. H. M. Owsley, who will act as manager for the new firm, formerly represented the Norvell-Shapleigh Hardware Company, St. Louis, in Georgia. He is a thorough, practical Hardwareman, and as a salesman was held in very high estimation by the house whom he represented.

Stearns & Chenoweth have lately bought the Hardware business of Meinser Bros. They expect to build a new store during the coming summer.

Basin Hardware & Mercantile Company, Basin, Mont., have been incorporated with a capital of $15,000. They will open their new store about June 15.

The Doolittle Bros. Company, Painesville, Ohio, have incorporated with a capital of $20,000, succeeding Doolittle Bros., dealers in Hardware, Paints, Agricultural Implements, Sash, Doors, &c. Charles E. Doolittle is president; Robert E. Doolittle, vice-president; H. Marshall Doolittle, treasurer, and N. T. Breed, secretary.

PRICE-LISTS, CIRCULARS, &c.

Manufacturers in Hardware and related lines are requested to send us duplicate copies of catalogues, price-lists, &c., one copy for our Catalogue Department in New York and another for our London Office; and at the same time to call our attention to any new goods or additions to their line, of which appropriate mention will be made, besides the brief reference to the catalogue or price-list in this column.

W. C. HELLER & Co., Montclair, N. J.: Net price-list of Heller's Steel Hardware Shelf Boxes, of which 21 sizes are carried in stock.

BROWN & SHARPE MFG. COMPANY, Providence, R. I.: Pamphlet showing Tool Makers' Calipers and Dividers, with round legs, and made to insure extreme rigidity, combined with lightness and durability.

THE BANTAM MFG. COMPANY, Bantam, Conn.: New catalogue showing their lines of Ball and Roller Bearings, designed for all forms of machine construction. The line includes plain Roller Bearings with soft rollers or with hardened ground rolls, Roller Bearings with shells and with shells and sleeves, Thrust Roller Bearings, Turntable Bearings for industrial railways, Thrust Ball Bearings, Radial Ball Bearings and Layland's Patent Roller Bearings.

LANDERS, FRARY & CLARK, New Britain, Conn., and 82 Chambers street, New York: Illustrated catalogue No. 23 of Plumbers' Brass Goods and Hardware, containing 177 pages, including large assortments of Compression Faucets, Bibs, Bath Cocks and kindred goods, together with some specialties of analogous character, such as Lawn Sprinklers, Nozzles, Filters, Towel Racks, &c.

KOLESCH & Co., 138 Fulton street, New York: Drawing and Tracing Papers, Sun Print Papers and Equipments, Drawing Instruments and Materials, Surveying Instruments, accessories, &c.

THE AMERICAN WOODEN WARE MFG. COMPANY, Toledo, Ohio: Catalogue No. 40, Churns, Washing Machines, Flower and Tree Tubs, Plant and Jardinière Stands, Stable, Derrick and Foundry Pails, and all kinds of cooperage.

TORONTO MACHINE COMPANY, Toronto, Ohio: The Paragon Tool Holder for work on Planers, Shapers and Lathes, the cutter being clamped between two true square faces.

THE BRISTOL TRUNK HARDWARE COMPANY, INCORPORATED, Bristol, Conn., have isued their first catalogue showing that although the business was started less than a year ago, the company's line of Trunk Hardware is quite complete. The catalogue is attractively illustrated.

MISCELLANEOUS NOTES.

N. R. Davis & Sons.

N. R. Davis & Sons, Assonet, Mass., are directing the attention of the trade to their improved cocking lever hammerless gun, with imported walnut stock and fore-end. They manufacture six grades of this gun, sold at a moderate price. This gun, together with their complete line, is shown in their latest catalogue.

Machine Handles.

The New Britain Hardware Mfg. Company, New Britain, Conn., are putting on the market a line of machine handles turned from solid bar with or without thread. The handles are of handsome design and are furnished in six sizes, ranging from 2 to 5 inches in extreme length and ⅝ to 1⅝ inches in diameter of ball.

Diamond Hand and Lathe Tools.

J. L. Osgood, 121 and 131 Erie County Bank Building, Buffalo, N. Y., is manufacturing Osgood's Black Diamond tools for all mechanical purposes, for truing and shaping emery, corundum and carborundum wheels, grindstones, &c. One group is numbered 1, 2, 3 and 4, the diamond being finely set in a round steel rod 7-16 inch in diameter fitted in a hardwood handle, 12 inches long over all. They list from $5 to $15 each and are for wheels 6 to 12 inches in diameter and for both 54 and 30 emery, and finer. Another line is that of diamond hand and lathe tools. In these the diamond is firmly set in a steel shank 1 x ½ x 7 inches, and fitted with hardwood handle for hand use. These are numbered 10 to 13, inclusive, and list $12 to $20 each for wheels 10 to 16 inches in diameter and emery Nos. 54, 40, 36 and 24 and finer, according to the tool.

Calipers and Dividers of New Design.

The accompanying illustrations, Figs. 1, 2 and 3, show a new line of tool makers' calipers and dividers recently placed on the market by Brown & Sharpe Mfg. Company, Providence, R. I. The tools are designed to meet the requirements of more delicate work in tool making, as well as for general use. The legs are round, not flat, which adds materially to the stiffness and gives a most

Fig. 1.—Tool Makers' Outside Spring Calipers.

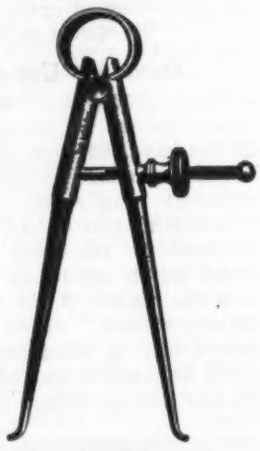


Fig. 2.—Tool Makers' Inside Spring Calipers.

desirable neatness and finish. The fulcrum stud is hardened so as to reduce the wear to a minimum and to prevent the roughing up of the bearings. The spring is unusually stiff and of improved form, with concave ends that fit into grooves milled in the ends of the legs. This construction is to insure rigidity, preventing side deflection of the legs and giving uniform pressure throughout the extreme movement. The legs are of steel, highly polished, and every care is taken to have them uniform in

Fig. 3.—Tool Makers' Spring Dividers.

finish. The measuring points come together evenly. The screw is referred to as of exceptionally fine pitch for accurate adjustment and is provided with a solid nut and hardened thrust washer. The three tools illustrated are each made in 2, 3 and 4 inch sizes. Especial attention is directed to the 2-inch size, by the manufacturers, as being of convenient size for small, light work and for carrying in the pocket.

Unexcelled Silk Lines.

Clark, Horrocks & Co., Utica, N. Y., are offering the new lines shown herewith. The line illustrated in Fig.

Fig. 1.—Unexcelled Enamel Silk Line.

1 has been brought out to meet the demands of expert fishermen for a fine semitransparent trout line. It is referred as absolutely water proof, made of highest quality pure silk. In Fig. 2 is represented a high grade dark

Fig. 2.—Unexcelled Silk Casting Line.

greenish black line, made from the best quality pure silk, and designed to meet the demand for a high grade black bass casting line at a popular price.

Hudson .30-40 U. S. Bullet.

The bullet here illustrated is put on the market by the Ideal Mfg. Company, New Haven, Conn. It is a modification of the Hudson bullet, No. 308,256. It is 1-16 inch shorter over all. The point is shaped after the pattern of the U. M. C. Thomas bullet. The length of the bullet from under the band C is exactly the same; the middle groove is filled, thus securing greater

Hudson .30-40 U. S. Bullet.

weight at the base and presenting more surface, which increases the grip on the rifling; the front band C is precisely the same as in No. 308,256. The Ideal dirt catcher is retained. The weight of this bullet when cast from pure lead is about 200 grains, and with the alloy of 10 per cent. antimony, 10 per cent. tin and 80 per cent. lead, which mixture is recommended, the bullet will be about 170 grains, which, it is stated, is really the same as the regular factory middle range bullet, 180 grains. The new bullet will be designated in the Ideal Hand Book as No. 308,268.

White's Sparrow Proof Blind Catch.

To prevent sparrows roosting behind blinds, J. B. White, 63 Burnett street, Providence, R. I., is introducing

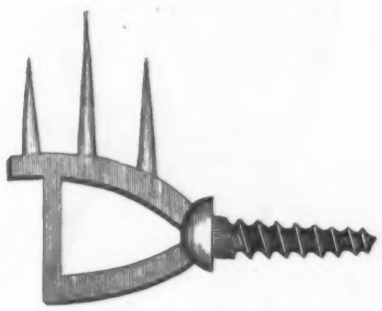


Fig. 1.—White Sparrow Proof Blind Catch.

the blind catch shown herewith. It is heavier and more durable than the ordinary catch, and can be easily sub-

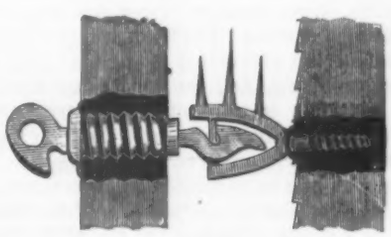
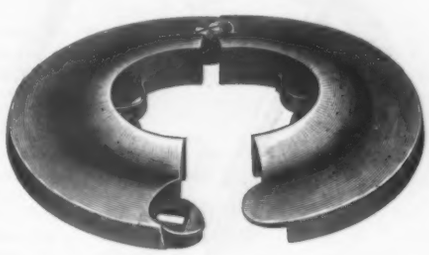


Fig. 2.—Blind Catch in Use.

stituted for the catch already in use. Its use is alluded to as saving money and annoyance.

Wells Patent Ceiling Plate.

The Beaton & Corbin Mfg. Company, Southington, Conn., are making the Wells patent ceiling plate, here shown. It is made of cast iron, plain finish and polished and nickeled, in the following sizes: ⅜, ½, ¾, 1, 1¼, 1½, 2, 2½, 3, 3½, 4, 4½, 5, 6, 7 and 8 inch hole diameters, for pipe, to make a finish where the pipe pierces the ceiling.



Wells' Patent Ceiling Plate.

On each side is a one-piece flat steel spring so formed as to grip the pipe sufficiently to hold the plate securely without other fastening. It is hinged at one side with a beveled catch on the opposite inner side.

ALLEN D. HALL, for 28 years engaged in the manufacture of Refrigerators at Charlestown, Mass., died at his home in East Somerville, Sunday, May 29. Mr. Hall was born in Nobleboro, Maine, in 1828. He was employed at the Charlestown Navy Yard from 1860 to 1872.

Steinbach Folding Studio Chair and Table.

S. A. Nye Mfg. Company, Fairfield, Maine, for whom E. M. La Roche & Co., 50 Warren street, New York, are sole selling agents, are putting on the market the Steinbach folding studio chair and table, as here illustrated.

Fig. 1.—Steinbach Folding Chair.

Fig. 1 represents it as a comfortable arm chair for den, porch, veranda, camp, summer resort, &c., Fig. 2 showing it in the form of a table. It also has other possibilities, as, for example, an individual requiring a handy table for writing, sketching, &c., can by seating himself first, then slide the upper section, which may be readily separated, on the arms in front of him, while two individuals, each having a chair, can draw them together arranged in the same way and have a table between them, for playing cards or other similar purposes. When through, the chair can be quickly collapsed or folded to occupy less room either for carrying about or setting aside until

Fig. 2.—Chair in Form of Table.

needed again, if space is valuable. The dimensions of this article are as follows: Hight of seat from floor, 17 inches; hight of table, 27 inches; perforated seat, 18 inches wide and 14 inches deep; size of table, 24 inches long, 20½ inches wide; side arms, 10 inches high; hight of back from seat, lower section, 17 inches; hight of back, entire, 29 inches; size of writing or reading desk, 12 inches deep, 20½ inches wide, 11 inches high from seat. Length, when folded, 48 inches, thickness 8½ inches. Spread of feet (outside measure), 21 inches. Legs, 1½ inches wide by ⅞ inch thick. The chair is made of hard wood finished in golden oak, mahogany, myrtle green, ebony, half polished or Flemish finishes, and packed six in a crate. This chair is also made in a smaller size for children's use.

Crescent, Columbia and Gem Molding Hooks.

The Western Wire Goods Company, Buffalo, N. Y., are offering the molding hooks shown herewith. They are

Crescent, Columbia and Gem Molding Hooks.

catalogued as Crescent, Columbia and Gem, the designs being additions to the company's line of these goods.

The Indispensable Combination Drawing Set.

Kolesch & Co., 138 Fulton street, New York, manufacturers of surveying instruments and drawing materials, have just put on the market the portable Indispensable combination drawing set, as here shown, and at a very moderate price. The set consists of a pair of dividers, pencil compass and pen compass in one instrument. The pen and pencil points are each made integral

Fig. 1.—Combination Divider.

Fig. 2.—Indispensable Drawing Set in Pocket Case.

with one of the steel points, and each one of these pieces is firmly joined to one of the legs. It is reversible, so that either a steel point or the pen and pencil point can be brought down on the drawing surface. Thus there are no loose parts or screws to lose, while the instrument is always quickly adjustable for use. The instrument is made of strong sheet metal, bent and braced, making it both light and very rigid. The joints are strong and of an improved form, so that, it is said, they will not lose their adjustment. Closed, the device measures 5¼ x 5-16 x 7-16 inch, weighs but ¾ ounce and is polished and nickeled. This compass is also put up in a neat pocket case with clasp, with a good 5-inch ruling pen for drawing straight lines, the dimensions of the case being 5 x 1 x ⅜ inch, weighing complete about 1 ounce. This set is especially useful for builders, draftsmen, mechanics, engineers, surveyors, architects, students, &c., in field work, or any situation where a larger or finer set is not available.

Daisy Senior Cream Separator.

The Daisy Senior cream separator consists of two cans or cylinders. One can sets within the other. Both cans are made of heavy IXX tin. The outer can contains the milk and the inner can the water. The inner can or cooling cylinder is connected with the faucet of the outer can by a short detachable tube. The tube is made of brass, nickel plated inside and out, and is strong and substantial. The faucet is of substantial nickel plated brass and will run a stream over ½ inch in diameter, thus emptying the can quickly. The cover of the separator is conical in shape, with a wire detachable strainer at the top, so that when the cover is inverted it makes a desirable strainer for the milk. The strainer screws on or off like a screw cap, making it easy to put in a new piece of wire gauze, in case the original gauze gets injured. In the side of the outer can are mica sight panes, through which the milk and cream can be seen. The can, neatly painted and then baked, possesses a smooth enameled surface that will stand washing. When using the separator the cooling cylinder is placed in the separator, and the cylinder is filled with cool water. The milk is then poured into the separator, and the cover is put on, the water and the milk being kept entirely separate. The cooling cylinder is set in place as easily as setting one ordinary can inside of a larger one. In filling the separator the milk is poured in without the necessity of being careful for fear of overflowing it, as is the case with shallow pans, or crocks, and there is no skimming to do. In hot weather, if it is so desired, the water in the cooling cylinder can be drawn off and the cylinder refilled with fresh cold water, without disturbing the milk or cream. The water, the milk and the cream are drawn off separately, but through the same faucet. Used as above described, as a cooler, the cream rises the same as it would in an ordinary can, simply being aided by the cooling can in the center. It can also be used as a water mixing separator. When used in this way the center cylinder is lifted out and put to one side. This leaves the separator empty with its entire holding capacity available for use. A funnel is furnished with every separator and is hung in place, and the separator becomes a water mixing separator, which will bring the cream in 30 to 60 minutes from the time the milk is put into it, the milk and the cream then being ready to be drawn off through the faucet. In this case, of course, the milk will be diluted by the water which has been poured into it. The separator, which can be very easily cleaned, is offered by the Daisy Cream Separator Company, Sixth and Wyandotte streets, Kansas City, Mo.

Daisy Senior Cream Separator.

H. D. Thompson & Co., Malone, N. Y., have been incorporated with a capital stock of $65,000 to carry on the wholesale and retail business in Hardware, Shelf and Heavy, Tinware, Sporting Goods, &c.

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Current Hardware Prices.

REVISED JUNE 7, 1904

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer, are printed in *Italics*, and the prices named, unless otherwise stated, represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33⅓ @ 33⅓ & 10% signifies that the price of the goods in question ranges from 33⅓ per cent. discount to 33⅓ and 10 per cent. discount.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued May, 1904, which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—A new edition of "Standard Hardware Lists" has been issued and contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Abrasives—

Adamite in Carloads:
Crystal ... ℔ ton $90@100
Grain ... ℔ ton $120@140
See also *Emery.*

Adjusters, Blind—

Domestic, ℔ doz. $3.00 ... 33⅓%
North's ... 10%
Zimmerman's—See *Fasteners, Blind.*

Window Stop—

Ives' Patent ... 35%
Taplin's Perfection ... 35%

Ammunition—See *Caps, Cartridges, Shells, &c.*

Anvils—American—

Armand Hammer, Wrought ℔ lb 8½@8¾c
Eagle Anvils ... ℔ lb 7¼@7½c
Hay-Budden, Wrought ... 9@9¼c
Horseshoe brand, Wrought ... 9@9¼c
Trenton ... ℔ lb 9@9¼c

Imported—

Peter Wright & Sons ... ℔ lb 10½c

Anvil, Vise and Drill—

Millers Falls Co., $18.00 ... 15&10%

Apple Parers—See *Parers, Apple, &c.*

Aprons, Blacksmiths'—

Hull Bros. Co ... 30&5%
Livingston Nail Co ... 33⅓%

Augers and Bits—

Com. Double Spur ... 75@75c&5%
Boring Machine Augers ... 66⅔@70%
Car Bits, 12-in. twist ... 60@60c&10%
Jennings' Pattern ... 50c&10c&5@60%
Ford's Auger and Car Bits ... 40&5%
Forstner Pat. Auger Bits ... 25%
C. E. Jennings & Co.:
No. 10 ext. lip, R. Jennings' list 25&10%
No. 30, R. Jennings' List, 40&7½&10%
Russell Jennings' ... 25&10&2½%
L'Hommedieu Car Bits ... 15&10%
Mayhew's Countersink Bits ... 45%
Millers' Falls ... 50&10&7½%
Ohio Tool Co.'s Bailey Auger and Car Bits ... 40&10%
Pugh's Black ... 30%
Pugh's Jennings' Pattern ... 35%
Snell's Auger Bits ... 60%
Snell's Bell Hangers' Bits ... 50&10%
Snell's Car Bits, 12-in. twist ... 60%
Wright's Jennings Bits (R. Jennings' list) ... 50%

Bit Stock Drills—

See *Drills, Twist.*

Expansive Bits—

Clark's small, $18; large, $26 ... 50&10%
Clark's Pattern, No. 1, ℔ doz., $26; No. 2, $18 ... 50&10%
Ford's, Clark's Pattern ... 50&10&60%
C. E. Jennings & Co., Steer's Pat. ... 25&10%
Swan's ... 60%

Gimlet Bits—

Common Double Cut ..gro. $3.00@3.25
German Pattern ... gro. $4.50@4.75

Hollow Augers—

Bonney Pattern, per doz. $10.00@11.00
Ames ... 25&10%
New Patent ... 25&10%
Universal ... 30%
Wood's Universal ... 25%

Ship Augers and Bits—

Ford's ... 40%
C. E. Jennings & Co.:
L'Hommedieu's ... 15&10%
Watrous' ... 33⅓&10%
Ohio Tool Co.'s ... 40%
Snell's ... 40%

Awl Hafts, See *Hafts, Awl.*

Awls—

Brad Awls:
Handled ... gro. $2.75@3.00
Unhandled, Shouldered .gro. 65@66c
Unhandled, Patent ... gro. 66@70c
Peg Awls:
Unhandled, Patent ... gro. 31@32c
Unhandled, Shouldered .gro. 65@70c
Scratch Awls:
Handled, Common .. gro. $3.50@4.00
Handled, Socket .. gro. $11.50@12.00
Hurwood ... 40%

Awl and Tool Sets—See *Sets, Awl and Tool.*

Axes—

First Quality ... $5.50@6.00
Second Quality ... $4.75@5.25

Axle Grease—See *Grease, Axle*

Axles— *Iron or Steel*

Concord, Loose Collar ... 5@5½c
Concord, Solid Collar ... 5@5½c
No. 1 Common ... 4@4½c
No. 1½ Com. New Style ... 4½@5c
No. 2 Solid Collar ... 4¼@5¼c
Nos. 7, 8, 11 and 12 ... 60c&5@60c&10%
Nos. 13 to 14 ... 60@5@60c&10%
Nos. 15 to 18 ... 60c&10@70%
Nos. 19 to 22 ... 60c&10@70%

Boxes, Axle—

Common and Concord, not turned .. lb. 4¼@4½c
Common and Concord, turned ... lb. 5@5½c
Half Patent ... lb. 9@9½c

Bait— Fishing—

Heudryx:
A Bait ... 20%
B Bait ... 25%
Competitor Bait ... 20&5%

Balances— Sash—

Caldwell new list ... 50%
Pullman's ... 60%

Spring—

Spring Balances ... 60@60c&5%
Chatillon's:
Light Spg. Balances ... 40&10%
Straight Balances ... 40%
Circular Balances ... 50%
Large Dial ... 30%
Pelouze ... 50%

Barb Wire—See *Wire, Barb.*

Bars— Crow—

Steel Crowbars, 10 to 40 lb., per lb ... 3@3½c

Towel—

No. 10 Ideal, Nickel Plate ... ℔ gro, $8.50

Beams, Scale—

Scale Beams, List Jan. 12, '82. 40c&10%
Chattillon's No. 1 ... 30%
Chattillon's No. 2 ... 40%

Beaters— Carpet—

Holt-Lyon Co.:
No. 12 Wire Coppered ℔ doz $0.85; Tinned ... $1.00
No. 11 Wire Coppered ℔ doz. $1.10; Tinned ... $1.20
No. 10 Wire Galvanized ... ℔ doz. $1.75
Western W. G. Co.
No. 1 Electric ... ℔ gro. $7.80
No. 2 Buffalo ... ℔ gro. $9.00
No. 3 Perfection Dust ... ℔ gro. $8.00

Egg—

Holt-Lyon Co.:
Holt, No. A, Japanned ... ℔ doz. $1.20
Holt, No 1, Tinned ... ℔ doz. $1.50
Holt, No. B, Japanned ... ℔ doz. $2.00
Holt, No. 2, Tinned ... ℔ doz. $2.25
Lyon, No 2, Japanned ... ℔ doz. $1.25
Lyon, No. 3, Japanned ... ℔ doz. $1.50
Lightning Chain, ℔ gro ... $15.00
National Mfg. Co.: ℔ gro.
No. 1 Dover, Family size ... $7.00
No. 2 Dover, Hotel size ... 14.00
Taplin Mfg. Co.: ℔ gro.
No. 60 Improved Dover ... $6.00
No. 75 Improved Dover ... 6.50
No. 100 Improved Dover ... 7.00
No. 102 Improved Dover, Tin'd ... 8.50
No. 150 Improved Dover, Hotel ... 15.00
No. 152 Imp'd Dover, Hotel, T'd ... 17.00
No. 200 Imp'd Dover Tumbler ... 8.50
No. 202, Imp'd Dover Tumbler, Tin'd ... 9.50
No. 300, imp'd Dover Mammoth, ℔ doz ... $25.00
Western, W. G. Co., Buffalo ... $7.00
Wonder (S. S. & Co.) ... ℔ gro. net, $6.00

Bellows—

Blacksmith, Standard List .. 75@75c&5%

Blacksmiths'—

Inch..	30	32	34	36	38	40
Each	$3.50	3.75	4.25	4.80	5.35	6.15

Extra Length:
Each .$4.00 4.55 5.10 5.60 6.40 7.50

Molders—

Inch	10	12	14
Doz	$8.50	10.00	13.00

Hand—

Inch	6	7	8	9	10
Doz	$4.25	4.50	5.00	6.50	7.75

Net Prices.

Bells— Cow—

Ordinary goods ... 75c&5@75c&10%
High grade ... 70c&10@70c&10c&5%
Jersey ... 75&10%
Texas Star ... 50%

Door—

Abbe's Gong ... 45%
Barton Gong ... 55%
Home, R. & E. Mfg. Co.'s ... 55&10%
Lever and Pull, Sargent's ... 60&10&10%
Yankee Gong ... 55%

Hand—

Hand Bells, Polished, Brass ... 60c@60c&10%
White Metal ... 60%
Nickel Plated ... 50@50c&5%
Swiss ... 60@60c&7½%
Cone's Globe Hand Bells ... 33⅓@33⅓&10%
Silver Chime ... 33⅓@33⅓&10%

Miscellaneous—

Farm Bells ... lb. 2¼@2½
Steel Alloy Church and School ... 50c&10@60c&5%
American Tube & Stamp'g Co. Gongs .. 75%
Table Call Bells ... 50@50&10%
Trip Gong Bells ... 55&10@60%

Belting— Rubber—

Agricultural (Low Grade) .. 75@75c&5%
Common Standard ... 70@70c&10%
Standard ... 65@70%
Extra ... 60c&5@60c&10%
High Grade ... 50c&5@50c&10%

Leather—

Extra Heavy, Short Lap ... 60@60c&5%
Regular Short Lap 60c&10@60c&10c&10%
Standard ... 70@70c&5%
Light Standard ... 70c&10%
Cut Leather Lacing ... 60c&10%
Leather Lacing Sides, per sq. ft .. 18c

Bench Stops—See *Stops, Bench*

Benders and Upsetters, Tire—

Detroit Perfected Tire Bender ... 40%
Green River Tire Benders and Upsetters ... 20%
Detroit Stoddard's Lightning Tire Upsetters, No. 1, $4.25; No. 2, $7.25; No. 3, $10.50; No. 4, $16.25; No. 5, $20.50.

Bicycle Goods—

John S. Leng's Son's 1902 list:
Chain ... 50%
Parts ... 50%
Spokes ... 50%
Tubes ... 60%

Bits—

Auger, Gimlet, Bit Stock Drills, &c.—See *Augers and Bits.*

Blocks— Tackle—

Common Wooden ... 70c&10@75c&5%
Hollow Steel Blocks, with Ford's Patent Sheaves ... 50&10%
Lane's Patent Automatic Lock and Junior ... 30%
Stowell's Novelty, Mal. Iron ... 50&10%
Stowell's Self Loading ... 60%
See also *Machines, Hoisting.*

Boards, Stove—

Zinc, Crystal, &c ... 30c&10@40c&5%

Bolts—

Carriage, Machine, &c.—

Common Carriage ... 75@ ... %
Phila. Eagle, $3.00 list May 24, '99 ... 80@80c&10%
Bolt Ends, list Feb. 14, '95 ... 75@ ... %
Machine ... 75@75c&5%
Machine with C. & T. Nuts ... 70c&5@ ... %

Door and Shutter—

Cast Iron Barrel, Round Brass Knob:

Inch	3	4	5	6	8
Per doz	$0.26	.30	.39	.47	.65

Cast Iron Spring Foot:

Inch	6	8	10
Per doz	$1.00	1.25	1.75

Cast Iron Chain, Flat, Japanned:

Inch	6	8	10
Per doz	$0.75	1.05	1.30

Cast Iron Shutter, Brass Knobs:

Inch	6	8	10
Per doz	$0.57	.80	1.00

Wrt Barrel, Jap'd .75c&10@75c&10c&10%
Wrought Bronzed .40c&5@50c&10%
Wrought Flush, B. K .. 50c&10@60c&10%
Wrought Shutter ... 40c&10c&10@60c&5%
Wrought Square Neck ... 50@50c&10%
Wrought Sunk, Flush ... 50@50c&10%
Ives' Patent Door ... 60%

Stove and Plow—

Plow ... 65c&10@ ... %
Stove ... 50c&5@50c&10c&5%

Tire—

Common ... 72½@72½c&10%
Norway Iron ... 80@80c&10%
American Screw Company:
Norway Phila., list Oct. 16, '84 ... 80%
Eagle Phila. list Oct. 16, '84 ... 82½%
Bay State, list Dec. 28, '99 ... 72½%
Franklin Moore Co.:
Norway Phila., list Oct. 16, '84 ... 80%
Eagle Phila., list Oct. 16, '84 ... 82½%
Eclipse, list Dec. 28, '99 ... 72½%
Russell, Burdsall & Ward Bolt & Nut Co.
Empire, list Dec. 28, '99 ... 72½%
Norway Phila., list Oct. '84 ... 80%
Upson Nut Co.:
Tire Bolts ... 72½%

Borers, Tap—

Borers Tap, Ring, with Handle:

Inch	1¼	1½	1¾	2
Per doz	$4.30	5.00	5.75	7.25
Inch	2¼	2½		
Per Doz	$8.65	11.50		

Enterprise Mfg. Co., No. 1, $1.25; No. 2, $1.65; No. 3, $2.50 each ... 25%

Boxes, Mitre—

C. E. Jennings & Co ... 25&10%
Langdon ... 15&10%
Perfection ... ℔ doz. $36 00
Schatz ... 40%

Braces—

Common Ball, American .. $1.15@1.25
Barber's ... 50&10&10@60&10%
Fray's Genuine Spofford's ... 60%
Fray's No. 70 to 120, 81 to 123, 207 to 414 ... 60%
C. E. Jennings & Co ... 50&5&10%
Mayhew's Ratchet ... 60%
Mayhew's Quick Action Hay Patent .. 50%
Millers Falls Drill Braces ... 25&10%
P., S. & W. Co. Peck's Patent 60&10@65%

Brackets—

Wrought Steel ... 80@ ... %
Bradley's Wire Shelf:
Full cases ... 80&10&10%
Broken cases ... 80&10%
Griffin's Pressed Steel ... 80%
Griffin's Folding Brackets ... 70&10%
Stowell's Cast Shelf ... 75%
Stowell's Sink ... 50%
Western, W. G. Co., Wire ... 60&10%

Bright Wire Goods—See *Wire and Wire Goods.*

Broilers—

Western, W. G. Co ... 80%
Wire Goods Co ... 75@75&10%

Buckets, Well and Fire—

See *Pails*

Bucks, Saw—

Hoosier ... ℔ gro. $36.00

Bull Rings—See *Rings, Bull.*

Butts— Brass—

Wrought list Sept., '96 ... 30@30%
Cast Brass, Tiebout's ... 50%

Cast Iron—

Fast Joint, Broad ... 50@50c&10%
Fast Joint, Narrow ... 50@50c&10%
Loose Joint ... 70c&5@70c&10%
Loose Pin ... 70c&5@70c&10%
Mayer's Hinges ... 70&5@70c&10%
Parliament Butts ... 70c&5@70c&10%

Wrought Steel—

Table and Back Flaps ... 75%
Narrow and Broad ... 75%
Inside Blind ... 75&10%
Loose Pin ... 75%
Loose Pin, Ball and Steeple Tip ... 80&20%
Japanned, Ball Tip Butts .. 70c&10%
Bronzed Wrt. Nar. and Inside Blind Butts ... 65c&10%

Extra 10@10&10%

Cages, Bird—

Hendryx, Brass:
3000, 5000, 1100 series ... 5%
1200 series ... 33⅓%
200, 300, 600 and 900 series ... 40&10%
Hendryx Bronze:
700, 800 series ... 40&10%
Hendryx Enameled ... 40&10%

Calipers—See *Compasses.*

Calks, Toe and Heel—

Blunt, 1 prong ... per lb. 4@4¼c
Sharp, 1 prong ... per lb. 4¼@4¾c
Perkins' Blunt Toe ... cents, ℔ lb .365
Perkins' Sharp Toe ... cents, ℔ lb .415

Can Openers—See *Openers, Can*

Cans, Milk—

	5	8	10 gal.	
Illinois Pattern.	$1 50	2.00	2.25	each.
Iowa Pattern...	....	2.35	2.50	each,
	20	30	40	qts.
New York Patt'rn	1.65	2.40	2.75	each.
Baltimore Patt'rn	....	1.80	2.00	each.

Cans, Oil—

Buffalo Family Oil Cans:			
3	5	10 gal.	
$48.00	64.20	120.00	gro., net

Caps—Percussion—

Eley's E. B. 60c
G. D ..... per M 34@35c
F. L. ..... per M 40@45c
G. E. ..... per M 50@51c
Musket ..... per M 62@63c

Primers—

Berdan Primers, $2.00 per M... 20&5%
B. L Caps (Sturtevant Shells) $2.00 per M 20%
All other primers per M. $1.50@$1.60

Cartridges—

Blank Cartridges:
32 C. F., $5.50 ..... 10c&5%
38 C. F., $7.00 ..... 10c&5%
22 cal. Rim, $1 50 ..... 10c&5%
32 cal. Rim, $2.75 ..... 10&5%
B. B. Caps, Con., Ball Smgl $1.90
B. B. Caps, Round Ball $1.40
Central Fire 25%
Target and Sporting Rifle ..... 15c&5%
Primed Shells and Bullets ..... 15c&10%
Rim Fire Sporting 50%
Rim Fire, Military ..... 15&5%

Cases, Show—

Sun, No. 102. Silent Salesman, 6 ft., $25.00

Casters—

Bed ..... 70@70c&10%
Plate ..... 60c&5@60c&10%
Philadelphia ..... 75@75c&5%
Boss ..... 70&10%
Boss Anti-Friction ..... 30&10%
Gem (Roller Bearing) ..... 75&5%
Martin's Patent (Phœnix) 45%
Smith & Hemenway Co. 33⅓%
Standard Ball Bearing 45%
Tucker's Patent low list 90%
Yale (Double Wheel) low list 45%

Cattle Leaders—

See *Leaders, Cattle.*

Chain, Coil—

American Coil, Jobbers' Shipments:

3-16	¼	5-16	⅜	7-16	½	9-16
3.00	5.30	4.15	3.75	3.60	3.50	3.45
⅝	¾	⅞	1 to 1¼ inch.			
3.30	3.25	3.50	3.15	per 100 lb.		

German Coil ..... 60&10c&10%

Halters and Ties—

Halter Chains ..... 60c&10@60c&10c&10%
German Pattern Halter Chains, list July 24, '97 ..... 60c&10&10@.....%
Cow Ties ..... 60@60c&10%

Trace, Wagon, &c.—

Traces, Western Standard: 100 pair
6¼—6-3, Straight, with ring...$23.50
6½—6-2, Straight, with ring.. $24.50
6¾—8-2, Straight, with ring.. $28.00
6¾—10-2, Straight, with ring..$32.00
Add 2c per pair for Hooks.
Twist Traces 2c per pair higher than Straight Link.
Trace, Wagon and Baney Chains.. 60c&5@60c&10c&5%

Miscellaneous—

Jack Chain, list July 10, '93:
Iron ..... 60c&10@60c&10c&5%
Brass ..... 60c&10@60c&10c&10%
Safety Chain ..... 75@75c&10c&5%
Gal. Pump Chain ..... lb 4¼@4¾c
Covert Mfg. Co.
Breast ..... 40&2%
Halter ..... 40&2%
Heel ..... 40&2%
Rein ..... 40&2%
Stallion ..... 40&2%
Covert Sad. Works:
Breast 70%
Halter 70%
Hold Back 70%
Rein 70%
Oneida Community:
Am. Coil and Halters ..... 40@40&5%
Am. Cow Ties ..... 45@50%
Eureka Coil and Halters ..... 45@50&5%
Niagara Coil and Halters ..... 45@50&5%
Niagara Cow Ties ..... 45&5@50&10&5%
Niagara Wire Dog Chains ..... 45@50&5%
Wire Goods Co.
Dog Chain ..... 70&10%
Universal Dbl-Jointed Chain 50%

Chalk—(From Jobbers.)

Carpenters' Blue ..... gro. 40c
Carpenters', Red ..... gro. 35c
Carpenters', White ..... gro. 30c
See also Crayons.

Checks, Door—

Bardsley's 45%
Columbia ..... 50&10%
Eclipse ..... 60&10%

Chests, Tool—

American Tool Chest Co.:
Boys' Chests, with Tools 55%
Youths' Chests, with Tools 40%
Gentlemens' Chests, with Tools 30%
Farmers', Carpenters', etc., Chests, with Tools 20%
Machinists' and Fit) Fitters' Chests, Empty 50%
C. E. Jennings & Co.'s Machinists' Tool Chests ..... 33⅓&10%

Chisels—

Socket Framing and Firmer

Standard List ..... 70@70c&10%
Buck Bros 30%
Charles Buck 30%
C. E. Jennings & Co. Socket Firmer No. 10 ..... 60&10%
C. E. Jennings & Co. Socket Framing No. 15 ..... 60&10%
Ohio Tool Co.'s 70%
Swan's 70%
L. & I. J. White ..... 50@30&5%

Tanged—

Tanged Firmers ..... 40c&5@40c&10%
Buck Bros 30%
Charles Buck 30%
C. E. Jennings & Co. Nos. 194, 181 ..... 16⅔&10%
L. & I. J. White, Tanged ..... 35&5%

Cold—

Cold Chisels, good quality..lb. 15@15c
Cold Chisels, fair quality..lb. 11@12c
Cold Chisels, ordinary ..... *lb. 9 @10c*

Chucks—

Beach Pat., each $8.00.. ..... 3&5%
Pratt's Positive Drive 25%
Empire 25%
Blacksmiths' 25%
Skinner Patent Chucks:
Independent Lathe Chucks 50%
Universal 50%
Combination 50%
Drill Chucks, New Model 30%
Drill Chucks, Standard 40%
Drill Chucks, Skinner Patent, 0, 1, 2, 3, 4 ..... 30%
Drill Chucks, Skinner Patent, 3, 4, 5, 6, 7, 8 ..... 30%
Drill Chucks, Positive Drive 30%
Planer Chucks 25%
Face Plate Jaws 40%
Standard Tool Co.:
Improved Drill Chuck 45%
Union Mfg. Co.:
Combination 50%
Czar Drill 35%
Combination Geared Scroll 40%
Geared Scroll 40%
Independent 50%
Independent Steel 40%
Union Drill 45%
Universal 50%
Independent Iron Face Plate Jaws 40%
Independent Steel Face Plate Jaws 40%
Westcott Patent Chucks:
Lathe Chucks 50%
Little Giant Auxiliary Drill 45%
Little Giant Double Grip Drill 45%
Little Giant Drill, Improved 45%
Oneida Drill 45%
Scroll Combination Lathe 45%

Clamps—

Adjustable, Hammers' ..... 20@20&5%
Cabinet, Sargent's ..... 50&10%
Carriage Makers', P., S. & W. Co. 50%
Carriage Makers' Sargent's 60%
Besly, Parallel ..... 33⅓&10%
Linemans' Utica Drop Forge & Tool Co 40%
Saw Clamps, see *Vises, Saw Misers'.*

Cleaners, Drain—

Iwan's Champion, Adjustable 55%
Iwan's Champion, Stationary 40%

Sidewalk—

Star Socket, All Steel ..... ₱ doz. $4.05 net
Star Shank, All Steel ..... ₱ doz. $3.24 net
W. & C. Shank, All steel, ₱ doz., 7½ in., $3.00; 8 in., $3.25.

Cleavers, Butchers'—

Foster Bros. 30%
New Haven Edge Tool Co.'s 45%
Fayette R. Plumb ..... 33⅓&33⅓&10%
L. & I. J. White 30%

Clippers—

Chicago Flexible Shaft Company:
'98 Chicago Horse ..... $8.75 } 15%
1902 Chicago Horse ..... $10.75 }
20th Century Horse, each, $5.00 ..... 30%
Lightning Belt ..... $15.00 }
Chicago Belt ..... $20.00 } 15%
Stewart's Patent Sheep ..... $18.50 }

Finger Nail Clippers—

Smith & Hemenway Co. ..... doz. net $2.00

Clips, Axle—

Eagle 5-16 and ⅜ inch ..... 75@75c&10%
Norway, 5-16 and ⅜ inch ..... 60c&10@70%

Cloth and Netting, Wire —See *Wire, &c.*

Cocks, Brass—

Hardware list:
Compression, Plain Bibbs, Globe, Kerosene, Racking, &c., Cocks. 70c&10@75%

Coffee Mills—See *Mills, Coffee.*

Collars, Dog—

Brass, Walter B. Stevens & Son's list. 40%
Embossed, Gilt, Walter B. Stevens & Son's list ..... 30&10%
Leather, Walter B. Stevens & Son's list 40%

Combs, Curry—

Metal Stamping Co. ..... 30&10%

Mane and Tail—

Covert's Saddlery Works ..... 60&10%

Compasses, Dividers, &c.

Ordinary Goods ..... 75c&5@75c&10%
Bemis & Call Hdw. & Tool Co.:
Dividers 65%
Calipers, Double 65%
Calipers, Inside or Outside 65%
Calipers, Wing 60%
Compasses 50%

Compressors, Corn Hook—

J. B. Hughes' ₱ doz. $2.50

Conductor Pipe, Galva —

L. C. L. to Dealers:

Territory.	*Nested.*	*Not nested.*
A. Eastern.	75c&7½%	75c&2½%
B. Eastern.	75c&10c&2½%	75c&7½%
Central.	75c&7½%	75%
Southern	70c&10%	70c&5%
S. Western.	70c&7½%	70c&2½%

Terms, 60 days, 2% cash, 10 days. Factory shipments generally delivered.
See also *Eave Troughs.*

Coolers, Water—

Gal. each.	2	3	4	6	8	
Labrador	$1.20	$1.50	$1.80	$2.10	2.70	
Gal.	3	4	6	8		
Iceland, en.	$1.80	$2.10	2.40	$3.00		
Gal.	2	3	4	6	8	
Galv. Lined Ea.	$1.85	$2.00	$2.2	$2.90	$3.80	25%

Ga.v. Lined side handles

Gal.	2	3	4	6	8	
Each.	$1.95	$2.15	$2.40	$3.30	$4.15	25%

Coopers' Tools—

See *Tools, Coopers'.*

Cord—Sash—

Braided, Drab ..... *lb. 35c*
Braided, White, Cam ..... *lb. 23@25c*
Cable Laid Italian..lb. A, 18c; B, 16c
Common India ..... *lb. 10@10½c*
Cotton Sash Cord, Twisted ..... 20@25c
Patent Russia ..... *lb. ..@15c*
Cable Laid Russia ..... *lb. ..@15c*
India Hemp, Braided ..... *lb ..@18c*
India Hemp, Twisted ..... *lb. 12@13c*
Patent India, Twisted ..... *lb. 12@13c*
Anniston Cordage Co.: Braided Cotton.
Old Glory, Nos. 7 to 12 ..... ₱ ℔ 30 ¢
Anniston, Nos. 7 to 12 ..... ₱ ℔ 25 ¢
Old Colony, Nos. 7 to 12 ..... ₱ ℔ 25 ¢
Anniston Drab, Nos. 7 to 12 ..... ₱ ℔ 30 ¢
Pearl Braided, cotton, No. 6 ₱ ℔, 24¢; Nos. 7 to 12, 25¢.
Eddystone Braided Cotton, No. 6 ₱ ℔ 27¢
Harmony Cable Laid Italian, No. 7 to 10 ..... ₱ ℔ 33¢
Peerless:
Cable Laid Italian ..... 16¢
Cable Laid Russian ..... 14¢
Cable Laid India ..... 12¢
Braided India ..... 18¢
Samson, Nos. 7 to 12:
Braided, Drab Cotton ..... ₱ ℔ 30½¢
Braided, Italian Hemp ..... ₱ ℔ 36¢
Braided, Linen ..... ₱ ℔ 53¢
Braided, White Cotton or Spot ₱ ℔ 33¢
Massachusetts, White ..... ₱ ℔ 28 ¢
Massachusetts, Drab ..... ₱ ℔ 32 ¢
Phœnix, White, No's 7 to 12 ..... 24¢
No. 6 cords, 1¢ extra.
Silver Lake:
A quality, Drab ..... 40¢
A quality, White ..... 35¢
B quality, Drab ..... 35¢
B quality, White ..... 30¢
Italian Hemp ..... 40¢
Linen ..... 57½¢

Wire, Picture—

List Oct., '00 ..... 35c&10@35c&10c&10c&5%

Cradles—

Grain ..... 40c&12½%

Crayons—

White Round Crayons, gross..5½&@6c
Cases, 100 gro., $4.00, at factory.
D. M. Steward Mfg. Co.
Jumbo Crayons ..... gr. $3.50 } 30%
Metal Workers' Crayons ..... gr. $2.50 } Cash 10%
Soapstone Pencils, round, flat or square ..... gr. $1.50 }
Rolling Mill Crayons ..... gr. $2.50 }
Railroad Crayons (composition) ..... gr. $2.00 }
Zeinicker's Lumber:
Red, Blue, Green ..... ₱ gro. $6.50
Black ..... ₱ gro. $4.00
See also *Chalk.*

Crooks, Shepherds'—

Fort Madison, Heavy ..... ₱ doz. $7.00
Fort Madison, Light ..... ₱ doz. $6.50

Crow Bars—See *Bars, Crow.*

Cultivators—

Victor Garden 50%

Cutlery, Table—

International Silver Company:
No. 12 Medium Knives, 1847 ..... ₱ doz. $3 50
Star, Eagle, Rogers & Hamilton and Anchor ..... ₱ doz. $3.00
Wm. Rogers & Son ..... ₱ doz. $2 50

Cutters—Glass—

H. H. Mayhew Co. 40%
Red Devil 50%
Smith & Hemenway Co. 50%
Woodward 40%

Meat and Food—

American 30%

Nos.	1	2	8	4	8	5
Each	$5	$7	$10	$25	$50	$80

Enterprise ..... 25@25&7½%

Nos.	5	10	12	22	32
Each	$2	$3	$2.75	$4.50	$6

Dixon's, ₱ doz. ..... 30&10@40%

Nos.	1	2	3	4
	$14.00	$17.00	$19.00	$30.00

Ideal ..... 40&10@50%
Little Giant, ₱ doz. ..... 33⅓@40%

Nos.	305	310	312	390	328
	$35.00	$48.00	$44.00	$73.00	$68.00

N. E. Food Choppers 40%
New Triumph No. 605, ₱ dos. $24.00 .. 30&10@40%
Russwin Food No. 1, $24 00; No. 2, $27.00 .. 45&10&10%
Sterling ..... 40@40&1%
No. 1....$2.00 each No. 2.. $2.50 each
Woodruff's, ₱ dos ..... 30&10@40%

Nos.	100	150
	$15.00	$18.00

Enterprise Beef Shavers ..... 25@30%

Slaw and Kraut—

Henry Disston & Sons:
Slaw, Corn Grater, &c 40%
Kraut Cutters 24 x 7, 26 x 8, 30 x 9 ..... 55%
Kraut Cutters 36 x 13, 40 x 12 ..... 40%
J. M. Mast Mfg. Co.:
Slaw Cutters, 1 Knife ..... ₱ doz. $3.00
Combined Slaw Cutter and Corn Grater ..... ₱ doz. $4.00
Sterling, $6.00 each 33⅓%
Tucker & Dorsey Mfg. Co.:
Kraut Cutters 40%
Slaw Cutters, 1 Knife, ₱ gr. ..$18@$20
Slaw Cutters, 2 Knife, ₱ gr. ..$22@$36

Tobacco—

All Iron, Cheap ..... *doz. $4.25@$4.50*
Enterprise ..... 35&5%
National, ₱ doz. No. 1, $21; No. 2, $18.. 40%
Sargent's, ₱ doz., No. 2 ..... 60%
Sargent's No 12 and 21 ..... 60&10%

Washer—

Appleton's, ₱ dos. $16.00 ..... 50&10&10%
Bonney's 33⅓%

Diggers, Post Hole, &c.—

Dalbey Post Hole Auger...per doz.. $9.00
Iwan's Improved Post Hole Auger. 40&5%
Iwan's Vaughan Pattern Post Hole Augers, ₱ doz. $6.50
Iwan's Perfection Post Hole Digger.. ₱ doz. $8.50
Iwan's Split Handle Post Hole Diggers, ₱ doz. $7.50
Kohler's Universal ..... ₱ doz. $15.00
Kohler's Little Giant ..... ₱ doz. $12.50
Kohler's Hercules ..... ₱ doz. $10.00
Kohler's Invincible ..... ₱ doz. $9 60
Kohler's Rival ..... ₱ dos. $8.50
Kohler's Pioneer ..... ₱ dos. $7.50
Never-Break Post Hole Diggers, ₱ doz. $24.00 ..... 60%
Samson, ₱ dos. $34.00 ..... 25%

Dividers—See *Compasses.*

Doors Screen—

Phillips', style E, 7½ in. ..... ₱ doz, $10.50
Phillips', style G77, 7½ in. ..... ₱ doz, $8.00
Phillips', style x-y, 7½ in. ..... ₱ doz, $11.00
Porter's Plain, No. 6 ..... ₱ doz. $6 75
Porter's Ornamental, No. 70. ₱ doz. $10.50
Porter's No. 20 ..... $9.00
Porter's No. 44 ..... $10.75

Drawers, Money—

Sun Money Drawers, No. 5, ₱ doz. $9.50; No. 6, with Bell, $10.50; No. 6, with Gong, $10.50.
Tucker's Pat. Alarm Till No. 1, ₱ doz. $18; No. 2, $15; No. 3, $12; No. 4, $18

Drawing Knives—

See *Knives, Drawing.*

Drills and Drill Stocks—

Common Blacksmiths' Drill...each $1.50@$1.75
Breast, Millers Falls ..... 15&10%
Breast, P., S. & W ..... 40&5%
Goodell Automatic Drills..40&5@40&10%
Johnson's Automatic Drills Nos. 2 and 3 ..... 10⅔&10%
Johnson's Drill Points ..... 10⅔&5&10%
Millers Falls Automatic Drills....33⅓&10%
Ratchet, Curtis & Curtis 25%
Ratchet, Parker's 40%
Ratchet, Weston's 33⅓%
Ratchet, Whitney's, P. S. & W 50%
Whitney's Hand Drill, No. 1, $10.00; Adjustable, No. 10, $12.00 ..... 33⅓%

Twist Drills—

Bit Stock ..... 60c&10@60c&10c&10%
Taper and Straight Shank ..... 60c&10@60c&10c&5%

Drivers, Screw—

Screw Driver Bits..per doz. ..45@75c
Baisey's Screw Holder and Driver, ₱ doz. 2½-inch, $6; 4-in., $7.50 6-in., $9..40%
Buck Bros' Screw Driver Bits 30%
Champion 50%
Edson 60%
Fray's Hol. H'dle Sets, No. 3, $12.00 50%
Gay's Double Action Ratchet 35%
Goodell's Auto 50&10&10@50&10&10&5%
Hurwood 40%
Mayhew's Black Handle 40%
Mayhew's Monarch ..... 40&10%
Millers Falls, Nos. 20 and 21 ..... 25&10%
Millers Falls, Nos. 11, 12, 41, 42 ..... 15&10%
Never Turn 60%
New England Specialty Co. 50%
Sargent & Co.'s:
Nos. 1 and 60 ..... 50&10&10%
Nos. 50 and 55 ..... 60&10%
Nos. 20 and 40 ..... 70&10%
Smith & Hemenway Co ..... 40&5%
H. D. Smith & Co.'s, Perfect Handle... 40%
Stanley & R. & L. Co.'s:
No. 64, Varnished Handles ..... 30@60&10&10%
No. 80 ..... 70@70&10&10%
Swan's:
Nos. 65 to 68 ..... 50%
No. 40 ..... 40&10%
Nos. 25, 35 and 45 ..... 20&10&10%

Eave Trough, Galvanized

Territory.	*L. C. L.*	
A. Eastern	*80c&10%*	
B. Eastern	*80c&10c&5%*	
Central	*80c&10%*	
Southern	*75c&10&5%*	
S. Western	*75c&10c&5%*	

Terms, 2% for cash. Factory shipments generally delivered.
See also *Conductor Pipe and Elbows.*

Elbows and Shoes—

Factory shipments 60%
Perfect Elbows (S. S. & Co.) 30%

Emery, Turkish—

	4 to 5	*5 to 150*	*Flour*
Kegs ..... *lb.*	*5c*	*5½c*	*5¾c*
¼ Kegs ..... *lb.*	*5¼c*	*5¾c*	*6¾c*
Kegs ..... *lb*	*5c*	*6c*	
10-lb cans, 10 in case	*6¼c*	*7c*	*8c*
10-lb. cans, less than 10	*10c*	*10c*	*8c*

Note.—In lots 1 to 3 tons a discount of 10% is given.

Extractors, Lemon Juice —See *Squeezers, Lemon.*

Fasteners, Blind—

Zimmerman's ..... 50&10%
Walling's 50%

Cord and Weight—

Ives 40%

Faucets—

Cork Lined ..... 50@50c&10%
Metallic Key, Leather Lind 70@70c&10%
Red Cedar ..... 40@40c&10%
Petroleum ..... 70c&10@75%
B. & L. B. Co.:
Metal Key ..... 60&10%
Star 60%
West Lock ..... 50&10%
John Sommer's Peerless Tin Key 40%
John Sommer's Boss Tin Key 50%
John Sommer's Victor Metal Key. 50&10%
John Sommer's Duplex Metal Key.... 60%
John Sommer's Diamond Lock 40%
John Sommer's I. X. L. Cork Lined... 50%
John Sommer's Reliable Cork Lined ..... 50&10%
John Sommer's Chicago Cork Lined.. 60%
John Sommer's O. K. Cork Lined 50%
John Sommer's No Brand, Cedar 50%
John Sommer's Perfection Cedar.... 40%
McKenna, Brass:
Burglar Proof, N. P. 35%
Improved, ¾ and ⅞ inch 35%
Self Measuring:
Enterprise, ₱ dos. $36.00 ..... 40&10%
Lane's, ₱ dos. $36.00 ..... 40&10%
National Measuring, ₱ dos. $36..40&10%

Ferrule Plates—

See *Plates, Ferrule.*

Files—Domestic—

List revised Nov. 1, 1899.
Best Brands ..... 70c&5@70c&10c&5%
Standard Brands ..... 75c&5@75c&10c&10%
Second Quality ..... 75c&10c&10@50c&5%

Imported—

Stubs' Tapers, Stubs' list, July 24, '97 ..... 50%

Fixtures, Grindstone—

Net Prices:

Inch	*15*	*17*	*19*	*21*	*24*
Per doz.	*$2.15*	*2.85*	*3.25*	*3.75*	*4.80*

P., S. & W. Co. ..... 30@10@40%
Reading Hardware Co. 60%
Sargent's ..... 60&10&10%
Stowell's Giant Grindstone Hanger.... ₱ doz. $6.00
Stowell's Grindstone Fixtures, Extra Heavy ..... 50&10&10%
Stowell's Grindstone Fixtures Light .... 60&10%

Fodder Squeezers—

See *Compressors.*

Forks—

Base Discounts Aug. 1, 1899, list:
Hay, 2 tine.....50&10c&5%
Boys', & Fish, 2 tine.....50&10c&5%
Hay & Boys', 3 tine.....60c&5%
Hay & Boys', 4 tine.....66⅔&5%
Champion Hay.....66⅔&5%
Hay & Header, long 3 tine.....65%
Header, 4 tine.....65%
Barley, 4 & 5 tine, Steel.....60&10%
Manure, 4 tine.....60&15&2½%
Manure, 5 and 6 tine.....66⅔&2½%
Spading.....70&2½%
Potato Digger, 6 tine.....60&10%
Sugar Beet.....40&10%
Coke & Coal.....40&10%
Heavy Mill & Street.....65%
Iowa Dig-Esy Potato.....60&10%
Victor, Hay.....60&15&2½%
Victor, Manure.....66⅔%
Victor, Header.....65%
Champion, Hay.....66⅔%
Champion Header.....65%
Champion, Manure.....60&15&2½%
Columbia, Hay.....60&20%
Columbia, Manure.....70%
Columbia, Spading.....70&12½%
Hawkeye Wood Barley.....40%
W. & C. Potato Digger.....60&12½%
Acme Hay.....60&10&5%
Acme Manure, 4 tine.....60&20&7½%
Dakota Header.....65&15&5%
Jackson Steel Barley.....65&15&5%
Kansas Header.....66⅔%
W. & C. Favorite Wood Barley.....40%
Plated.—See *Spoons*.

Fountains, Stock—

Double Dewey.....₱ doz. $18.00

Frames— Saw—

White, Straight Bar, per doz. 75@80c
Red, Straight Bar, per doz $1.00@$1.25
Red, Double Brace, per doz. $1.40@1.50

Freezers Ice Cream—

Qt.....	1	2	3	4	6
Each....	$1.25	$1.60	$1.90	$2.20	$2.80

Fruit and Jelly Presses—

See *Presses, Fruit and Jelly*.

Fry Pans—See *Pans, Fry*.

Fuse— *Per 1000 Feet.*

Hemp.....$2.75
Cotton.....3.20
Waterproof Single Taped..3.65 } 10c&2½%
Waterproof Double Taped..4.40
Waterproof Triple Taped..5.15

Gates, Molasses and Oil—

Stebbins' Pattern..30c&10@30c&10c&5%

Gauges—

Marking, Mortise, &c.....
50c&10c&5@50c&10c&10c&5%
Chapin-Stephens Co.:
Marking, Mortise, etc.50&10@50&10&10%
Scholl's Patent.....50&10@50&10&10%
Door Hangers.....5@50&10%
Fulton's Butt Gauge.....30&10%
Stanley R. & L. Co.'s Butt & Babbet Gauge.....20@20&10&10%
Wire, Brown & Sharpe's.....25%
Wire, Morse's.....25%
Wire P., S. & W. Co.....30&10%

Gimlets— Single Cut—

Nail, Metal, Assorted, gro. $1.40@1.50
Spike, Metal, Assorted gro. $2.80@3.50
Nail, Wood Handled, Assorted, gro. $1.75@2.00
Spike, Wood Handled, Assorted gro. $4.25@4.50

Glass, American Window

See *Trade Report*.

Glasses, Level—

Chapin-Stephens Co.....60@60&10&10%

Glue—Liquid Fish—

Bottles or Cans, with Brush....25@50%
Cans (½ pts., pts., qts., ½ gal., gal.).....25@48%
International Glue Co. (Martin's).....40&10@50%

Grease Axle—

Common Grade.....*gro. $4.50@5.50*
Dixon's Everlasting....10-₱ pails, ea. 85¢
Dixon's Everlasting, in bxs..₱ doz. 1 ₱ $1.20; 2 ₱ $2.00

Grips, Nipple—

Perfect Nipple Grips.....40&10&2%

Griddles, Soapstone—

Pike Mfg. Co.....33⅓@33⅓&10%

Grindstones—

Bicycle Emery Grinder.....$6.50
Bicycle Grindstones, each.....$2.50@3.00
Pike Mfg. Co:
Improved Family Grindstones, per inch, per doz.....$2.00
Pike Mower Knife and Tool Grinder, each.....$6.00 } 33⅓%
Velox Ball Bearing, mounted, Angle Iron Frames.....each, $3.25

Halters and Ties—

Covert Mfg. Co.:
Web.....45&2%
Jute Rope.....40&5&5%
Sisal Rope.....20&2%
Covert's Saddlery Works:
Web and Leather Halters.....70%
Jute and Manila Rope Halters.....70%
Sisal Rope Halters.....60&20%
Jute, Manila and Cotton Rope Ties..70%
Sisal Rope Ties.....60&10%

Hammers—

Handled Hammers—

Heller's Machinists'..40&10@40&10&10%
Heller's Farriers.....40&10@40&10&10%
Magnetic Tack, Nos. 1, 2, 3, $1.25, $1.50, $1.75.....40@40&10@40&10%
Peck, Stow & Wilcox.....40&10&5%
Fayette R. Plumb:
Plumb, A. E. Nail.33⅓&7½@33⅓&10&7½%
Engineers' and B. S. Hand.....50&7½&5@50&10&7½&5%
Machinists' Hammers50&5@50&10&5%
Riveting and Tinners'.....40&3⅓@40&10&3⅓%
Sargent's C. S. New List.....40%

Heavy Hammers and Sledges—

Under 3 lb.....*lb 5c* } 75&10&5
3 to 5 lb.....*lb 4c* } @80%
Over 5 lb.....*lb. 30c*
Wilkinson's Smiths'.....9½c@10c lb.

Handles—

Agricultural Tool Handles—

Axe, Pick, &c.....45@50&5%
Hoe, Rake, &c.....45@50&5%
Fork, Shovel, Spade, &c.:
Long Handles.....45@50&5%
D Handles.....40%

Cross-Cut Saw Handles—

Atkins'.....40&5%
Champion.....45@45&10%
Disston's.....50%

Mechanics' Tool Handle.75

Auger, assorted.....*gro $2.50@$2.85*
Brad Awl.....*gro. $1.65@$1.85*
Chisel Handles:
Apple Tanged Firmer, gro. ass'd. $2.40@$2.65
Hickory Tanged Firmer, gro. ass'd. $2.15@$2.40
Apple Socket Firmer, gro. ass'd, $1.75@$1.95
Hickory Socket Firmer, gro. ass'd. $1.45 @ $1.60
Hickory Socket Framing, gro. ass'd. $1.60@$1.75
File, assorted.....*gro. $1.30@$1.40*
Hammer, Hatchet, Axe, &c.....50%
Hand Saw, Varnished, doz .80@85c
Not Varnished.....65@75c
Plane Handles:
Jack, doz. 30c; Jack Bolted.....75c
Fore, doz......*45c; Fore, Bolted*..*90c*
Chapin-Stephens Co.:
Carving Tool.....40@40&10%
Chisel.....65@65&10%
File and Awl.....65@65&10%
Saw and Plane.....40@40&10%
Screw Driver.....40@40&10%
Millers Falls Adj. and Ratchet Auger Handles.....15&10%
Nicholson Simplicity File Handle, ₱ gro.....$0.85@$1.50

Hangers—

NOTE.—*Barn Door Hangers are generally quoted per pair, without track, and Parlor Door Hangers per double set with track, &c.*

Barn Door, New Pattern, Round Groove, Regular:

Inch.....	3	4	5	6	8
Single Doz.	$0.90	1.25	1.60	1.95	2.50

Barn Door, New England Pattern, Check Back, Regular:

Inch.....	3	4	5	6
Single Doz......	$1.30	1.85	2.50	3.00

Allith Mfg. Co.
Reliable No. 1.....per doz. $12.00
Reliable No. 2.....per doz. $15.00
Chicago Spring Butt Co.: } Extra 5@10% often given.
Friction.....25%
Oscillating.....25%
Big Twin.....25%
Chisholm & Moore Mfg. Co.:
Baggage Car Door.....50%
Elevator.....30%
Railroad.....50%
Cronk & Carrier Mfg. Co.:
Loose Axle.....60%
Roller Bearing.....60&10%
Lane Bros. Co.:
Parlor, Ball Bearing.....$4.15
Parlor, Standard.....$3.35
Parlor, New Model.....$2.85
Parlor New Champion.....$2.25
Barn Door, Standard.50&10&10&5%
Hinged.....$6.40
Covered.....50&10&10%
Special.....50&10&10&5%
Lawrence Bros.:
Advance.....60%
Cleveland.....60&10%
Crown.....60%
Giant.....50&10%
New York.....60%
Peerless.....60&10%
Sterling.....60%
Swing, No. 95.....60%
Union, No. 44, $5.00; No. 45 $7.00; No. 46 $9.00.
McKinney Mfg. Co.:
No. 1, Special, $15.....60&10%
No. 2, Standard, $18.....60&10%
Hinged Hangers, $16.....50%
Meyers' Stayon Hangers.....60%
C. S. Smith Mfg. Co.:
Lundy Parlor Door.....50&10%
Monarch Barn Door.....60&10%
Never Jump Hinge.....50&10%
Peerless.....60&10%
Perfection.....70&5%
Phœnix.....70&5%
Wagner's Adjustable.....70&10%
Warehouse Anti-Friction.....60%
Richards Mfg. Co.:
Pioneer Wood Track No. 3.....$2.25
Imp'd Wood Track No. 5.....$2.25
Imp'd Steel Track No. 7.....$2.70
Imp'd Steel Track No. 7.....$2.65
Ball B'r'g Steel Track No. 9.....$2.50
Ball B'r'g Steel Track No. 10.....$2.50
Roller B'r'g Steel Track No. 11..$2.45
Roller B'r'g Steel Track No. 12..$2.40
Ball B'r'g Steel Track No. 13..$2.75
Roller B'r'g Steel Track No. 14..$2.65
Ball B'r'g Trolley Track No. 15..40%
Ball Brg Trolley Track No. 19...40&5%
Ball Bearing Tandem Trolley Track No. 16.....40%
Silent Adjustable Track No. 18...40%
Auto Adjustable Track No. 22...40%
Trolley B. D. No. 17.....$1.60
Trolley F. D. No. 120.....$2.70
Trolley F. D. No. 121.....$2.85
Trolley F. D. No. 151.....$3.00
Roller Bearing D. D. No. 25.....70&5
Roller Bearing U. S. B. D.....70&5%
Anti Friction B. D.....60&10%
Ives' Wood Track No. 1.....$2.15
Ives' Imp'd Wood Track No. 2..$2.15
Safety Door Hanger Co.:
Storm King Saftey.....60%
U. S. Standard Hinge.....60%
Stowell Mfg. and Foundry Co.:
Acme Parlor Ball Bearing.....40%
Ajax Hinge Door.....60%
Apex Parlor Door.....50&10&5%
Atlas.....60%
Baggage Car Door.....50%
Climax Anti-Friction.....50&10%
Elevator.....40%
Express.....50%
Freight Car Door.....60%
Interstate.....40&10%
Lundy Parlor Door..50&10%
Magic.....60%
Matchless.....60&10%
Nansen.....70&5%
Parlor Door.....55&10%
Railroad.....50&10%
Rex Hinge Door.....60%
Street Car Door.....50%
Steel, Nos. 300, 404, 500.....50&10%
Underwriter's Fire Door.....40%
Wild West Warehouse Door.....50%
Zenith for Wood Track.....50&10%
A. L. Swett Iron Works:
Eagle.....60&10%
Hylo.....50&10%
Perfection.....60%
Pilot.....60%
Taylor & Boggis F'y Co.'s Kidder's Roller Bearing.....50&15&10&5%
Wilcox Mfg. Co.:
Bike Roller Bearing.....60&10%
C. J. Roller Bearing.....60&10%
Cycle Ball Bearing.....50%
Dwarf Ball Bearing.....40%
Ives, Wood Track.....60&10%
L. T. Roller Bearing.....60&10&5%
New Era Roller Bearing.....50&10%
O. K. Roller Bearing.....60&10&5%
Prindle, Wood Track.....60%
Richards' Wood Track.....60%
Richards' Steel Track.....50&10%
Spencer Roller Bearing.....60&10%
Tandem Nos. 1 and 2.....60%
Underwriters' Roller Bearing....40%
Velvet.....50%
Wilcox Auditorium Ball Bearing.30%
Wilcox Barn Trolley No. 123.....40%
Wilcox Elv. Door, Nos 112 and 122½.50%
Wilcox Elv. Door, No. 132.....40%
Wilcox Fire Trolley, Roller Bearing.....30%
Wilcox Le Roy Noiseless Ball Bearing.....40%
Wilcox New Century.....50&10&10%
Wilcox O. K. Steel Track.....50%
Wilcox O. K. Trolley.....50%
Wilcox Trolley Ball Bearing....40%
Wilcox Wideman Narrow Gauge, Ball Bearing.....40%
For Track, see *Rail*

Extra 5@10% often given.

Hangers, Garment—

Western, W. G. Co.....70&10%

Gate—

Myers' Patent Gate Hangers, ₱ doz net 4.50

Hasps—

McKinney's Perfect Hasp, ₱ doz.....50%

Hatchets—

Regular list.....*40@40&5%*

Heaters, Carriage—

Clark, No. 3, $2.25; No. 2D, $2.75; No 3E, $4.25; No. 1, $4.50 each.....15%
Clark Coal, $0.75 ₱ doz.....10%

Hinges—

Blind and Shutter Hinges—

Surface Gravity Locking Blind: (Victor; National; 1868 O. P., Niagara; Clark's O. P.; Clark's Tip; Buffalo.)

No.....	1	3	5
Doz. pair.....	$0.85	1.75	3.50

Mortise Shutter: (L. & P., O. S., Dixie, &c.)

No.....	1	1¼	2	2½
Doz. pair....	$0.70	.65	.60	.55

Mortise Reversible Shutter, (Buffalo, &c.)

No.....	1	1½	2
Doz. pair....	$0.75	.70	.65

North's Automatic Blind Fixtures, No. 2, for Wood, $9.00; No. 3, for Brick, $11.50.....10%
Parker.....70@75%
Reading's Gravity.....50&5%
Sargent's, Nos. 1, 3, 5, 11 & 18.....70&10&75%
Stanley's Steel Gravity Blind Hinges, ₱ doz. sets, without screws, $0.80; with screws, $1.15.
Wrightsville H'dware Co.:
O. S., Lull & Porter.....7 &5%
Acme, Lull & Porter.....75%
Queen City Reversible.....75%
Stenger's Positive Locking, Nos. 1 & 3.....70&10%
Shepard's Noiseless, Nos. 60, 65, 55.....70&10%
Niagara, Gravity Locking, Nos. 1, 3 & 5.....75%
1868, Old Pat'n, Nos. 1, 3 & 5.....75%
Tip Pat'n, Nos. 1, 3 & 5.....75%
Buffalo Gravity Locking, Nos. 1, 3 & 5.....75%
Shepard's Double Locking, Nos. 20 & 25.....70%
Champion Gravity Locking, No. 75..75%
Steamboat Gravity Locking, No. 10..75%
Pioneer, Nos. 000, 45 & 5½.....75%
Empire, Nos. 101 & 103.....70%
W. H. Co.'s Mortise Gravity Locking, No. 3.....60%
Whipple's Patent Automatic.....30%

Gate Hinges—

Clark's or Shepard's—Doz. sets:

No.....	1	2	3
Hinges with Latches.	$2.00	2.70	5.00
Hinges only.....	$1.40	2.05	3.80
Latches only.....	.70	.70	.35

New England:
With Latch.....*doz* ....@$2.00
Without Latch.....*doz.* ....@$1.60
Reversible Self-Closing:
With Latch.....*doz.* ....@$1.75
Without Latch.....*doz.* ....@$1.35
Western:
With Latch.....*doz. $1.75*
Without Latch.....*doz. $1.15*
Wrightsville H'dware Co.:
Shepard's or Clark's, doz. sets,

No.	1	2	3
Hinges with Latches...	$2.00	2.70	5.00
Hinges only.....	1.40	2.05	3.80
Latches only.....	.70	.70	1.35

Spring Hinges—

Holdback Cast Iron gro...$9.00@9.50
Non-Holdback, Cast Iron.....
gro. $8.00@8.50
J. Bardsley
Bardsley's Non-Checking Mortise Floor Hinges.....45%
Bardsley's Patent Checking.....15%
Bommer Bros.:
Bommer Ball Bring Floor Hinges 40%
Bommer Spring Hinges.....40%
Chicago Spring Butt Co.:
Chicago Spring Hinges.....25%
Triple End Spring Hinges.....50%
Chicago (Ball Bearing) Floor Hinge.....50%
Garden City Engine House.....25%
Keene's Saloon Door.....25%
Columbian Hdw. Co.:
Acme, Wrt. Steel.....30%
Acme, Brass.....25%
American.....30%
Columbia, No. 14.....₱ gr. $9.00
Columbia, No. 18.....₱ gr. $25.00
Columbia, Adjustable, No. 7, ₱ gr. $12.00
Gem, new list.....30%
Clover Leaf.....₱ gr. $12.50
Oxford, new list.....30%
Lawson Mfg. Co.:
Matchless.....30%
Matchless Pivot.....45%
Shelby Spring Hinge Co.:
Crown Jamb Hinge.....40%
Chief Ball Bearing Floor Hinge.45%
Royal Ball Bearing Floor Hinge..15%
The Stover Mfg. Co.:
Ideal, No. 16, Detachable, ₱ gr $12.50
Ideal, No. 4.....₱ gr. $9.00
New Idea No. 1.....₱ gr. $9.00
New Idea, Double Acting.....35%

Extra 10% often given on most of these Hinges. Extra 10@10&10&5%

Wrought Iron Hinges—

Strap and T Hinges, &c., list Mar. 15, 1901:
Light Strap Hinges.....*80c&5%*
Heavy Strap Hinges 80c&20&10%
Light T Hinges.....*75c&10&5%*
Heavy T Hinges.....*75c&5%*
Extra Heavy T Hinges ..80c&20%
Hinge Hasps.....*70%*
Cor. Heavy Strap....*80c&20&10%*
Cor. Ex. Heavy T.....*80c&20%*

Screw Hook and Strap. { *6 to 12 in*.....*lb. 3½c* / *14 to 20 in*.....*lb. 3 c* / *22 to 36 in*.....*lb. 2¾c*

Screw Hook and Eye:
⅜ to 1 inch.....*lb. 6 c*
⅝-inch.....*lb. 7 c*
½-inch.....*lb. 9 c*

Hitchers, Stall—

Covert Mfg. Co., Stall Hitchers.....35%

Hods, Coal—

	15	16	17	18 inch.
Galv. Open..	$2.50	2.75	3.00	3.25 ₱ doz.
Jap. Open...	$2.00	2.25	2.50	2.75 ₱ doz.
Galv. Funnel.	$3.00	3.25	3.50	3.75 ₱ doz.
Jap. Funnel.	$2.50	2.75	3.00	3.25 ₱ doz.

Masons, Etc.—

Cleveland Wire Spring Co.:
Steel Mortar.....each $1.45
Steel Brick.....each $1.10

Hoes— Eye—

Scovil and Oval Pattern.....
60c&10@60c&10c&10%
Grub, list Feb. 23, 1899.....
70c&10@75%
D. & H. Scovil.....35%

Handled—

Aug. 1, 1899, List:
Field and Garden.....*70c&10%*
Smith's Patent.....*50%*
Meadow & Rhode Island.....*75%*
Black Diamond.....*70c&10%*
Mortar and Street.....*70c&10c&10%*
Planters'.....*75c&12½%*
Cotton.....*70c&10c&10%*
Cotton Chopper.....*75c&12½%*
Weeding Hoes.....*60c&c&15%*
Steel Weeders.....*60c&c&15%*
Malleable Weeders.....*66⅔&c&15%*
Ft. Madison Cotton Hoe.....70&10&10%
Ft. Madison Crescent Cultivator Hoe per doz.....70&10%
Ft. Madison Mattock Hoes:
Regular Weight..₱ doz. 66⅔%
Junior Size.....₱ doz. $4.00
Ft. Madison Sprouting Hoe, ₱ doz..50%
Ft. Madison Dixie Tobacco Hoe.....75&10&7½%
Kretsinger's Cut Easy.....70&10%
Warren Hoe.....55%
W. & C. Ivanhoe.....75&2%
B. B. 6 in, Cultivator Hoe.....$3.15
B. B., 6¼ in.....$3.35
Acme Weeding.....₱ doz., net, $4.35
W. & C. Lightning Shuffle Hoe, ₱ doz. $4.85

Hoisting Apparatus—

See *Machines, Hoisting*.

Holders— Bit—

Angular, ₱ doz. $24.00.....45&10%

Door—

Empire.....50%
Bardsley's.....45%

File and Tool—

Nicholson File Holders and File Handles.....33⅓@40%

Hooks—

Cast Iron—

Bird Cage, Reading.....50&10%
Bird Cage, Sargent's List.....60%
Ceiling, Sargent's List.....50&10%
Clothes Line, Reading List.....50%
Clothes Line, Sargent's List. 50&20&10%
Coat and Hat, Sargent's List..50&5&10%
Clothes Line, Stowell's.....70%
Coat and Hat, Reading.....50%
Coat and Hat, Stowell's.....70%
Coat and Hat, Wrightsville.....65%
Harness, Reading List.....50&10%
Harness, Stowell's.....60%
School House, Stowell's.....70%

Wire—

Belt.....*80c&10%*
Wire C. & H. Hooks.....*75@75c&10%*
Atlas, Coat and Hat:
Single Cases.....70%
10 Case Lots.....70&10%
Columbian Hdw Co. Gem.....60&10%
Parker Wire Goods Co.: King.....70&10%
Western W. G. Co. Molding.....75%

Wire Goods Co:
Acme.....60&10%
Chief.....70%
Crown.....70&10%
Czar.....65%
V Brace.....70&10%
Czar Harness.....50&10%

Wrought Iron—
Box, 6 in., per doz. $1.00; 8 in., $1.25; 10 in., $2.50.
Cotton.....doz. $1.05@1.25
Wrought Staples, Hooks, &c.—
See *Wrought Goods.*

Miscellaneous—
Hooks, Bench, see *Stops, Bench.*
Bush, Light, doz. $5.50; Medium, $6.00; Heavy, $6.50

Grass.....Nos.	1	2	3	4
Best.....	$1.50	1.75	2.00	
Common..	$1.30	1.50	1.60	

Potato and Manure.....60&15%
Wh. fletree.....lb. 5¾@6c
Hooks and Eyes:
Brass.....60&10&10@10%
Malleable Iron.....70&5@70&10%
Covert Saddlery Works' Self Locking Gate and Door Hook.....60%
Ft. Madison Cut-Easy Corn Hooks, ₩ doz. $5.35 net
Bench Hooks—See *Bench Stops.*
Corn Hooks—See *Knives, Corn.*

Horse Nails—See *Nails, Horse*
Horseshoes—
See *Shoes, Horse.*

Hose Rubber—
Garden Hose, ¾-inch:
Competition.....ft. 4½@ 5 c
3-ply Standard.....ft. 6½@ 7 c
4-ply Standard.....ft. 7½@ 8 c
2-ply extra.....ft. 8½@ 9 c
4-ply extra.....ft. 10 @10½c
Cotton Garden, ¾-in., coupled:
Low Grade.....ft. 6 @7 c
Fair quality.....ft. 8 @9 c

Irons—Sad—
From 4 to 10.....lb. 2¾@3 c
B. B. Sad Irons.....lb. 3¼@3½c
Chinese Laundry.....lb. 4¼@5c
Chinese Sad.....lb. 4@4¼c
Mrs. Potts', per set:

Nos.....	50	55	60	65
JapdTops	71	68	81	78
TindTops	74	71	84	81

New England Pressing.lb..3¾@4c

Pinking—
Pinking Irons.....doz. 50@60c

Soldering—
Soldering Coppers 2¼ and 3..19@20c
1¼ and 2.....21@22c

Jacks, Wagon—
Covert Mfg. Co.:
Auto Screw.....80&5%
Steel.....45&2%
Covert's Saddlery Works':
Daisy.....60&10%
Victor.....60&10%
Lockport.....50%
Lane's Steel.....30&10%

Kettles—
Brass, Spun, Plain.....20@25%
Enameled and Cast Iron—See *Ware, Hollow.*

Knives—
Butcher, Kitchen, &c.—
Foster Bros.' Butcher, &c.....30%
Smith & Hemenway Co.....40&10%
Wilkinson Shear & Cutlery Co.....50%
Hay and Straw—See *Hay Knives.*

Corn—
Withington Acme, ₩ doz., $2.65; Dent, $2.75; Adj. Serrated, $2.20; Serrated, $2.10; Yankee No. 1, $1.50; Yankee No. 2, $1.15.

Drawing—
Standard List.....70&5@70&10%
Bradley's.....35%
C. E. Jennings & Co. Nos. 45, 48, 60&10%
Jennings & Griffin. Nos. 51, 52, 60&10&10%
Ohio Tool Co.'s.....70%
Swan's.....70&10&2½%
Watrous.....10&5&10%
L. & I. J. White.....20&5@25%

Hay and Straw—
Lightning.....₩ doz. $6.50@7.00
Iwan's Sickle Edge.....₩ doz. $10.00
Iwan's Serrated.....₩ doz. $10.00
Maine.....₩ doz. $8.50

Mincing—
Buffalo.....₩ gro. $13.00

Miscellaneous—
Farriers'.....doz. $3.00@3.25
Wostenholm's.....₩ doz. $3.00@3.25

Knobs—
Base, 2¼-inch, Birch, or Maple, Rubber tip, gro.....$1.10@1.15
Carriage, Jap, all sizes..gro. 40@45c
Door, Mineral.....doz. 65@70c
Door, Por. Jap'd.....doz. 70@75c
Door, Por. Nickel....doz. $2.05@2.15
Bardsley's Wood Door, Shutter, &c...15%
Picture, Sargent's.....60&10&10%

Lacing Leather—
See *Belting Leather—*

Ladders, Step Etc.—
Lane's Store.....25%
Myers Noiseless Store Ladders.....50%

Ladles—Melting—
L. & G. Mfg. Co, Low List.....25%
P. S. & W.....50%
Reading.....60%
Sargent's.....45&10%

Lanterns—Tubular—
Regular Tubular No. 0. doz. $4.35@4.75
Lift Tubular..No. 0..doz. $4.75@5.25
Hinge Tubular..No. 0..doz. $4.75@5.25
Other Styles.....40&10@40&10&5%

Bull's Eye Police—
No. 1, 2¼ inch.....$2.50@2.75
No. 2, 3 inch.....$2.75@3.00

Lasts and Stands, Shoe—
Stowell's Atlas, Malleable Iron.....50%
Stowell's Badger, Cast Iron.....50%

Latches—
Thumb—
Roggin's Latches, with screw, dz 35@40c

Leaders, Cattle—
Small.....doz. 55c; large, 60c
Covert Mfg. Co.....45&2%

Lifters, Transom—
R. & E.....33⅓%

Lines—

Wire Clothes, Nos...	18	19	20
100 feet.....	$2.20	2.00	1.65
75 feet.....	$1.80	1.70	1.50

Samson Cordage Works:
Solid Braided Chalk, No. 0 to 3.....40%
Silver Lake Braided Chalk, No. 0, $6.00; No. 1, $6.50; No. 2, $7.00; No. 3, $7.50 ₩ gr.....20%
Masons' Lines, Shade Cord, &c.: White Cotton, No. 3½, $1.50. No. 4, $2.00; No 4½, $2.50; Colors, No. 3½, $1.75; No. 4, $2.25; No. 4½, $2.75; Linen, No. 3½, $2.50; No. 4, $3.50; No. 4½, $4.50.....20%
Tent and Awning Lines: No. 5, White Cotton, $7.50; Drab Cotton, $8.50.....30%
Clothes Lines, White Cotton: 50 ft., $2.75; 60 ft., $3.25; 70 ft., $3.75; 75 ft., $4.00; 80 ft., $4.25; 90 ft., $4.75; 100 ft., $5.25..30%
Anniston Waterproof Clothes, 50 ft., ₩ gro.: $36.00; Gilt Edge, $24.00; Air Line $24.00; Acme, $19.00; Alabama, $17.00; Empire, $18.00; Advance, $15.00; Oriole, $22.00; Albermarle, $15.00; Eclipse, $13.50; Chicago, $12.50; Standard, $11.00; Columbia, $9.50.

Locks—Cabinet—
Cabinet Locks.....35½@33⅓&6⅔&7½%

Door Locks, Latches, &c.—
[Net prices are very often made on these goods.]
Reading Hardware Co.....50%
R. & E. Mfg. Co.....40%
Sargent & Co.....40&10%
Stowell's Steel Door Latches.....30%

Elevator—
Stowell's.....50%

Padlocks—
Wrought Iron.....75&10&5@30&5%
R. & E. Mfg. Co. Wrt. Steel and Brass.....75@75&10%

Sash, &c.—
Ives' Patent:
Bronze and Brass.....62½%
Crescent.....50%
Iron.....62½%
Wrought Bronze and Brass.....55%
Wrought Steel.....55%
Reading.....net 50%

Machines—Boring—
Com. Upright, Without Augers..$2.00
Com. Angular, Without Augers..$2.25

R. & E. Mfg. Co.:	Upright.	Angular.
Improved No. 3.	$4.25	No. 1. $5.00
Improved No. 4.	3.75	No. 2. 3.38
Improved No. 5.	2.75	
Jennings'.. No. 4,	3.15	No. 1, 3.50
Millers' Falls.....		5.75
Snell's, Rice's Pat.	2.50	2.75

Corking—
Reisinger Invincible Hand Power.....₩ doz. $48.00

Fence—
Williams Fence Machines.....each, $5.50

Hoisting—
Moore's Anti-Friction Differential Pulley Block.....30%
Moore's Hand Hoist, with Lock Brake.20%

Ice Cutting—
Chandler's.....15&10%

Washing—

Boss Washing Machine Co.:	Per doz.
Boss No. 1, Boss Rotary.....	$57.00
Boss No. 7, Dietz Rotary.....	$60.00
Champion Rotary; Banner No. 1..	$54.00
Standard Champion No. 1.....	$48.00
Standard Perfection.....	$26.00
Cintl Square Western.....	$30.00
Uneeda American, Round.....	$29.00

Mallets—
Hickory.....45&5@50%
Lignumvitæ.....45&5@50%
Tinners', Hickory and Applewood, doz.....50@55c

Mashers, Vegetable—
Western, W. G. Co., Potato.....60&10%

Mats—Door—
Elastic Steel (W. G. Co.).....10%

Mattocks—
See *Picks and Mattocks.*

Milk Cans—See *Cans, Milk*

Mills—Coffee, etc.—
Enterprise Mfg. Co.....25@30%
National list Jan. 1, 1902.....30%
Parker's Columbia & Victoria.50&10@60%
Parker's Box and Side.....50&10@60%
Sun, No. 1080, 1 lb mill.....₩ doz. $3.00
Swift, Lake Bros Co.....30%

Mowers, Lawn—
Net prices are generally quoted.
Cheap.....all sizes, $1.75@2 00
Good.....all sizes, $2.25@2.50

	10	12	14	16-inch
High Grade	4.25	4.50	4.75	5.00

Continental.....60&5%
Great American.....70%
Great American Ball Bearing, new list.70%
Quaker City.....70%
Pennsylvania.....60&5%
Pennsylvania, Jr., Ball Bearing.....60%
Pennsylvania Golf.....50%
Pennsylvania Horse.....33⅓&5%
Pennsylvania Pony.....40&5%
Philadelphia:
Styles M., S., C., K. T.....70&5%
Style A, all Steel.....60&5%
Style E, High Wheel.....70&10&5%
Drexel and Gold Coin, low list...40&5%

Nails—
Cut and Wire. See Trade Report.
Wire Nails and Brads, Papered. List July 20, 1899...85&10&10@90%
Hungarian, Finishing, Upholsterers', &c. See Tacks.

Horse—

Nos.	6	7	8	9	10	
A. C.....	25	23	22	21	21	.....40&5%
C. B. K.....	25	23	22	21	21	.....40%
Anchor.....	29	21	20	19	18	.....40&5%
Champ'in.	28	26	25	24	23	.....50%
Coleman...	13	13	12	11	11	.....net
Maud S....	25	23	22	21	21	.....50%
New Haven	23	21	20	19	19	.....40&5%
Putnam....	23	21	20	19	18	.....33⅓%
New P'tn'm	19	18	17	16	16	.....10&10%

Western, per lb.....8¼c
Jobbers' special brands, per lb. 8@8¼c

Picture—

	1½	2	2½	3	3½ in.
Brass Head..	.55	.60	.70	.95	1.00 gro.
Por. Head...	..	1.10	1.10	1.10	.. gro.

Nippers, See *Pliers and Nippers.*

Nuts—
Cold Punched: *Off list.*
Mfrs. or U. S. Standard.
Square, plain.....$5.10
Hexagon, plain.....$5.60
Square, C. T. & R.....$5.50
Hexagon, C. T. & R.....$6.00
Hot Pressed:
Mfrs., U. S. or Nar. Gauge Stan'd.
Square Blank.....$5 80
Hexagon Blank.....$6.20
Square Tapped.....$5 80
Hexagon Tapped.....$6 30

Oakum—
Best or Government.....lb. 6¼c
Navy.....lb. 4¾c
U. S. Navy.....lb. 5¾c
Plumbers' Spun Oakum.....8¾c
In carload lots ¼c lb. off f.o.b. New York.

Oil Tanks—See *Tanks, Oil.*

Oilers—
Brass and Copper.....50&10%
Tin or Steel.....65&10%
Zinc.....65&10%
Chase or Paragon:
Brass and Copper.....45&10@50%
Tin or Steel.....65&10%
Zinc.....65&10%
Malleable, Hammers' Improved, No. 1 $3.60; No. 2, $4; No. 3, $4.40 ₩ doz. 20%
Malleable, Hammers' Old Pattern, same list.....50&10%
American Tube & Stamping Co.:
Spring Bottom Cans.....70@70&10%
Railroad Oilers etc.....60@60&10%

Openers—Can—
French.....doz. 35c
Iron Handle.....doz. 25@27c
Sprague, Iron Hdle..per doz. 35@40c
Sardine Scissors...doz. $1.75@$3.00
Marvel.....per doz. $1.25
National.....50%
Stowell's Sprague.....per doz. 35@45c
Tip Top.....per doz. $0.75
Triumph Shear.....₩ gro. $9.00

Egg—
Nickel Plate.....per doz., $2.00
Silver Plate.....per doz., $4.00

Packing—
Asbestos Packing, Wick and Rope, 14½@15c lb.

Rubber—
Sheet, C. I.....8@10c
Sheet, C. O. S.....9@13c
Sheet, C. B. S.....10@14c
Sheet, Pure Gum.....50@65c
Sheet, Red.....40@50c
Jenkins' Standard, ₩ lb 80¢....25@25&5%

Miscellaneous—
American Packing.....7@10c lb.
Cotton Packing.....16@25c lb.
Italian Packing.....9@12½c lb.
Jute.....4@4½c lb.
Russia Packing.....8@11c lb.

Pails—Creamery
S. S. & Co., with gauges.. No 1 $6.25; No. 2, $5.50 ₩ doz.

Galvanized—
Price per doz.

Quart.....	10	14	18
Water, Regular..	1.50	1.75	2.00
Water, Heavy....	2.75	3.00	3.25
Fire, Rd. Bottom.	2.20	2.60	2.80
Well.....	2.25	2.50	2.75

Pans—Dripping—
Standard List.....60&10@60&10&5%

Fry—
Common Lipped:

No.	1	2	3	4	5
Per doz.	$0.85	1.00	1.10	1.30	1.40

Roasting and Baking—
Regal, S. S. & Co., ₩ doz., Nos. 5, $4.50; 10 $5.25; 20, $5.75; 30, $6.25.
Savory, ₩ doz., net, Nos. 200, $9.00; 400, $15.00.
Simplex, ₩ gro.:

No.	40	50	60	140	150	160
	$30.00	35.00	42.00	31.00	39.00	46.00

Paper—Building Paper—

Asbestos:	lb.
Building Felt.....	3¼c
Mill Board, sheet, 40 x 40 inches	3½c
Mill Board, roll, thicker than 1-16 inch.....	3½c
Mill Board, roll, 1-16 in. thick and less.....	2½c

	Per roll
Rosin Sized Sheathing:	*500 sq. ft.*
Light wt., 25 lbs. to roll..	$0.40@0.45
Medium wt., 30 lbs. to roll..	$0.45@0.50
Heavy wt., 40 lbs. to roll..	$0.65@0.70

Black Water Proof Sheathing, 500 Sq ft., 1 ply, 55c; 2 ply, 85c; 3 ply, $1.10; 4 ply, $1.35.
Deafening Felt, 9, 6 and 4½ sq. ft. to lb., ton.....$41.00
Red Rope Roofing, 250 sq. feet per roll.....$1.75
NOTE.—*These goods are often sold at delivered prices.*

Tarred Paper.
1 ply (roll 300 sq. ft.), ton..$32.50@35.00
2 ply, roll 108 sq. ft.....55@60c
3 ply, roll 108 sq. ft.....78@80c
Slater's Felt (roll 500 sq. ft.).....75c
NOTE.—*Above prices often include delivery, and are for Eastern territory, where prices are controlled by agreement between the manufacturers. In open territory much lower prices are current.*
R. R. M. Stone Surfaced Roofing (roll 110 sq. ft.).....$2.00

Sand and Emery—
Flint Paper and Cloth...50&10@60%
Garnet Paper and Cloth.....25%
Emery Paper and Cloth...50&10@60%

Parers—Apple—
Advance.....₩ doz. $4.50
Baldwin.....₩ doz. $5.00
Bonanza Improved.....each $6.50
Daisy.....₩ doz. $4.00
Dandy.....each $7.50
Eureka Improved.....each $20.00
Family Bay State.....₩ doz. $15.00
Improved Bay State.....₩ doz. $36.00
Little Star.....₩ doz. $5.00
New Lightning.....₩ doz. $7.50
Reading 72.....₩ doz. $4.00
Reading 78.....₩ doz. $7.00
Rocking Table.....₩ doz. $6.00
Turn Table '98.....₩ doz. $6.75
White Mountain.....₩ doz. $6.00

Potato—
Saratoga.....₩ doz. $7.00
White Mountain.....₩ doz. $6 00

Picks and Mattocks—
List Feb. 23, 1899.....70&5@70&10%

Pinking Irons—
See *Irons, Pinking.*

Pins—Escutcheon—
Brass.....60@60&10%
Iron, list Nov. 11, '85.....60@60&10%

Pipe, Cast Iron Soil—
Standard, 2-6 in.....50&10%
Extra Heavy, 2-6 in.....65%
Fittings.....70%

Pipe, Merchant,
Steel Carload Lots, f.o.b, Pittsburgh.

Merchant Pipe.	*Black.*	*Galvanized.*
⅛, ¼, ⅜ inch.....	68%	53%
½-inch.....	71%	61%
¾ to 6 inch.....	75%	65%
7 to 12 inch.....	71%	61%

Pipe, Sewer—
Jobbers' Prices—
Standard Pipe and Fittings, 2 to 24 in.
New England.....67%
New York and New Jersey.....70%
Maryland, Delaware, East Penn. 72%
West Penn and West Va.....73%
Virginia.....75%
Ohio, Michigan and Ky.....75%
Indiana.....77%
Carload lots are generally delivered.

Pipe, Stove—
Edwards' Nested Stove Pipe:

	C. L.	L. C. L.
5 in., per 100 joints...	$7.50	$8 50
6 in., per 100 joints....	8.00	9.00
7 in., per 100 joints....	9.00	10.00

Planes and Plane Irons—
Wood Planes—
Bench, First quality.....40&5@40&10%
Bench, Second qual.....50&5@50&10%
Molding.....33⅓&5@33⅓&10%
Bailey's (Stanley R. & L. Co) 5&10@25&10&10%
Chapin-Stephens Co.:
Bench, First Quality.....40@40&10%
Bench, Second Quality.....50@50&10%
Molding.....33⅓@33⅓&10%
Toy and German.....40@40&10%
Gage Self Setting.....35%
Ohio Tool Co.:
Bench, First Quality.....40@40&10%
Bench, Second Quality.....50@50&10%
Molding.....33⅓@33⅓&10%
Adjustable Wood Bottom.....60%
Union.....60%

Iron Planes—
Bailey's (Stanley R. & L. Co).....25&10@25&10&10%
Chaplin's Iron Planes.....50&10%
Miscellaneous Planes (Stanley R. & L. Co.).....30&10@20&10&10%
Ohio Tool Co.'s Iron Planes.....60%
Sargent's.....60@60&10%
Union.....60%

Plane Irons—
Wood Bench Plane Irons.....30&5@30&10%
Buck Bros.....30%
Chapin-Stephens Co.....30@30&10%
Ohio Tool Co.....30%
Stanley R. & L. Co...20&10@20&10&10%
L. & I. J. White.....20&5@25%

Planters, Corn, Hand.
Kohler's Eclipse.....₩ doz. $8.50

Plates—
Felloe.....lb. 3¼@4c
Self-Sealing Pie Plates (R. & E. & Co.), ₩ doz. $2.00.....50%

Pliers and Nippers—
Button Pliers.....75@75&10%
Gas Burner, per doz., 5 in., $1.35@ $1.50; 6 in., $1.45@$1.50

Gas Pipe..	7	8	10	12-in.
	$2.00	$2.25	$3.00	$3.75

Acme Nippers.....50@50&5%
Bernard's:
Cutting Nippers.....33⅓%
Parallel, Pliers.....33⅓%
Paragon Pliers.....50%
Lodi Pliers.....50%
Combination and others.....33⅓%
Elm City Fence Pliers.....33⅓%
Cronk & Carrier Mfg. Co.:
American Button.....75&10%
Cronk's.....60%
Improved Button.....70&10%
Stub's Pattern.....50%
Combination and others.....33⅓%
Heller's Farriers' Nippers, Pincers, and Tools 40&10@40&10&10%
P., S. & W. Tinners' Cutting Nippers, 30@30&10%
Swedish Side, End and Diagonal Cutting Pliers.....50%
Utica Drop Forge & Tool Co.:
Pliers and Nippers, all kinds.....40%

Plumbs and Levels—
Chapin Stephens Co.:
Plumbs and Levels.....30@30&10&10%
Chapin's Imp. Brass Cor..40@40&10&10%
Pocket Levels.....30@30&10&10%
Level Glasses.....60@60&10&10%
Disston's Plumbs and Levels.....70%
Disston's Pocket Levels.....70
C. E. Jennings & Co.'s Iron.....25&10%
C. E. Jennings & Co.'s Iron, Adjustable.....33⅓&10%
Stanley R. & L. Co....30&10@30&10&10%

Stanley's Duplex.....20@20&10&10%
Woods' Extension.....33⅓&5

Poachers, Egg—

Buffalo Steam Egg Poachers, ₱ doz., No. 1, $6.00; No. 2, $9.00; No. 3, $9.00; No. 4, $12.00.....50&

Points, Claziers'—

Bulk and 1 lb. papers.....lb. 6¼c
½-lb. papers.....lb. 6½c
¼-lb. papers.....lb. 6¾c

Pokes, Animal—

Ft. Madison Hawkeye.....₱ doz. $3.25
Ft. Madison Western.....₱ doz. $4.00

Police Goods—

Manufacturers' Lists.....25@25&5%
Tower's.....25%

Polish—Metal—

Prestoline Liquid, No. 1 (¼ pt.), ₱ doz. $3.00; No. 2 (1 qt.), $9.72.....40%
Prestoline Paste.....40&10%
George William Hoffman:
U. S. Metal Polish Paste, 3 oz. boxes, ₱ doz. 50¢; ₱ gr. $4.50; ½ ℔ boxes, ₱ doz. $1.25; 1 ℔ boxes, ₱ doz. $2.25.
U. S. Liquid, 8 oz. cans, ₱ doz. $1.25; ₱ gr. $12.00.
Barkeepers' Friend Metal Polish, ₱ doz. $1.75; ₱ gr. $18.00.
Wynn's White Silk, ¼ pt. cans, ₱ doz.....$2.00

Stove—

Black Eagle Benzine Paste, 5 ℔ cans.. ₱ ℔ 10¢
Black Eagle, Liquid, ½ pt. cans ₱ doz. 75¢
Black Jack Paste, ¾ ℔ cans, ₱ gro. $9.00
Black Kid Paste, ½ ℔ can.....each, $0.65
Ladd's Black Beauty, gr. $10.00.....50%
Joseph Dixon's, ₱ gr. $5.75.....10%
Dixon's Plumbago.....₱ ℔ 8¢
Fireside.....₱ gr. $2.50
Gem, ₱ gr. $4.50.....10%
Japanese.....₱ gr. $3.50
Jet Black.....₱ gr. $3.50
Peerless Iron Enamel, 10 oz. cans..... ₱ doz. $1.50
Wynn's:
Black Silk, 5 ℔ pail.....each 70¢
Black Silk, ½ ℔ box.....₱ doz. $1.00
Black Silk, 5 oz. box.....₱ doz. $0.75
Black Silk, ½ pt. liq.....₱ doz. $1.00

Poppers, Corn—

1 qt., Square.....gro. $9.00
1 qt., Round.....gro. $10.00
1½ qt., Square.....gro. 11.00
2 qt., Square.....gro. 13.00

Post Hole and Tree Augers and Diggers—

See also *Diggers, Post Hole, &c.*

Posts, Steel—

Steel Fence Posts, each, 5 ft., 42¢; 6 ft., 46¢; 8½ ft., 48¢.
Steel Hitching Posts, each.....$1.30

Potato Parers—

See *Parers, Potato.*

Pots— Glue—

Enameled.....40%
Tinned.....35%

Powder—

In Canisters:
Duck, 1 lb. each.....45¢
Fine Sporting, 1 lb. each.....75c
Rifle, ½-lb. each.....15c
Rifle, 1-lb. each.....25c
King's Semi-Smokeless:

	Keg (25 ℔ bulk)	Half Keg (12½ ℔ bulk)	Quarter Keg (6¼ ℔ bulk)	Case 24 (1 ℔ cans bulk)	Half case (1 ℔ cans bulk)
	$6.50	$3.50	$1.90	$8.50	$4.50

King's Smokeless:

	Shot Gun	Rifle
Keg (25 ℔ bulk)	$12.00	$15.00
Half Keg (12½ ℔ bulk)	6.25	7.75
Quarter Keg (6¼ ℔ bulk)	3.25	4.00
Case 24 (1 ℔ cans bulk)	14.00	17.00
Half case 12 (1 ℔ cans bik)	7.25	8.75

Robin Hood smokeless Shot Gun..50&20%

Presses—Fruit and Jelly—

Enterprise Mfg. Co.....20@25%
Sensible.....33⅓%
2 qt., $2.00; 4 qt., $4.00; 10 qt., $6.00 each.

Seal Presses—

Morrill's No. 1, per doz. $20.00.....50%

Pruning Hooks and Shears—See *Shears.*

Pullers, Nail—

Cyclops.....50%
Dudly Improved Nail Puller.....50%
Miller's Falls, No. 3, per doz. $12.00.....33⅓&10%
Pearson No. 1, Cyclone Spike Puller, each $30.00.....50%
Pelican, ₱ doz. $9.00.....40&10%
Scranton, Case Lots:
No. 2 B (large).....$5.50
No. 3-B (small).....$5.00
Smith & Hemenway Co.:
Ajax.....60%
Diamond B, No. 2, case lots, ₱ doz $6.00
Diamond B, No. 3, case lots, ₱ doz $5.50
Eureka.....50%
Giant, No. 1, ₱ doz. $18; No. 2, $16.50; No. 3, $15.....40%
Yankee.....66⅔%

Pulleys—Single Wheel—

Inch	2	2½	3
Awning, doz	$0.55	.85	1.15

Hay Fork, Swivel or Solid Eye..... doz., 4 in., $1.15; 5 in., $1.40

Inch	2	2¼	2½
Hot House, doz	$0.70	.90	1.25

Inch	1¼	1½	1¾	2
Screw....doz	$0.16	.19	.23	.30

Inch	1¼	2	2¼	2½
Side.....doz	$0.30	.40	.55	.65
Inch	1½	1¾	2	2½
Tackle ...doz	$0.30	.42	.58	1.00

Stowell's:
Ceiling or End, Anti-Friction...60&10%
Dumb Waiter, Anti-Friction...60&10%
Electric Light.....60%
Side, Anti-Friction.....60&10%

Sash Pulleys—

Common Frame; Square or Round End, per doz., 1¾ and 2 in...16@19c
Auger Mortise, no Face Plate, per doz. 1¾ and 2 in......16@19c
Auger Mortise, with Face Plate, per doz., 1¾ and 2 in......16@19c
Acme.....1¾ in., 16¢; 2 in., 19¢
Common Sense, 1¾ in.....₱ doz., 18¢; 2 in., 20¢.
Fox-All-Steel, Nos. 3 and 7, 2 in. ₱ doz 50%
Grand Rapids All Steel Noiseless....50%
Ideal.....70&5%
Niagara.....1¾ in., 16¢; 2 in., 19¢
No. 26, Troy....1¾ in., 14½¢; 2 in., 16½¢
Star.....1¾ in., 16¢; 2 in., 19¢
Tackle Blocks—See *Blocks.*

Pumps—

Cistern.....60@60&10%
Pitcher Spout.....80@80&10%
Wood.....50@50&10%

Pump Leathers—

Plunger and Lower Valve—Per gro.:

Inch..	2	2¼	2½	2¾
	$2.20	2.50	2.75	3.00

Inch..	3	3¼	3½	3¾	4
	$3.30	3.60	3.85	4.10	4.40

Plunger Cup Leathers—Per 100:

Inch	2¼	3	3½	4
	$2.75	3.85	5.00	6.00

Barnes Dbl. Acting (low list).... 50&10%
Contractors' Rubber Diaphragm No. 3 B. & L. Block Co.....$16.00
Daisy Spray Pump.....₱ doz. $7.20
Flint & Walling's Fast Mail (low list).55%
Flint & Walling's Pitcher Spout.....80%
National specialty Mfg. Co., Measuring, $6.00.....80%
Mechanical Sprayer.....$7.20
Myer's Pumps, low list.....50%
Myers' Power Pumps.....50%
Myers' Spray Pumps.....50%

Punches—

Saddlers' or Drive, good..doz. 65@70c
Spring, single tube, good quality..... $1.75@2.00
Revolving (4 tubes)...doz. $3.50@3.75
Bemis & Call Co.'s Cast Steel Drive....50%
Bemis & Call Co.'s Check.....55%
Benard Spring Belt Punches.....33⅓%
Lodi Spring Belt Punches.....50%
Morrill's No. 1 (A.B.C.), ₱ doz., $15.00...50%
No. 2, ₱ doz. $22.50.....50%
Hercules, each $7.50.....50%
Niagara Hollow Punches.....40%
Niagara Solid Punches.....55&10%
Paragon Spring Belt Punches.....50%
Steel Screw, B & K. Mfg. Co.....40%
Tinners' Hollow, P., S. & W. Co.35@35&5%
Tinners' Solid, P., S. & W. Co., ₱ doz., $1.44.....60%

Rail— Barn Door, &c.—

Cast Iron, Barn Door: Flange Screw Holes for Rd. Groove Wheels:

½	⅝	¾	*In.*
$1.70	$2.10	$3.00	*100 feet.*

Angular for Sq. Groove Wheels:

Small.	*Med.*	*Large.*	
$1.50	1.90	2.60	*100 feet.*

Sliding Door, Iron Painted..2¼@2¾c
Sliding Door, Wrought Brass, 1¼ in.....lb.36c...30%
Allith Mfg. Co., No. 1, Reliable Hanger Track, ₱ foot.....8¢
Allith Mfg. Co., No. 2, Reliable Hanger Track, ₱ foot.....10¢
Cronk's Double Braced Steel Rail, ₱ foot.....3½¢
Cronk's O. N. T. Rail.....9¼¢
Lane's Hinged Track, ₱ 100 ft., 1 in., $3.70; 1¼ in., $4.40.
Lanes' O. N. T., ₱ 100 ft., 1 inch, $3.00; 1¼ inch, $3.70; 1¼ inch, $4.00.
Lanes' Standard, 1¼ in., ₱ 100 ft.....4.00
Lawrence Bros., ₱ ft. 11¢.....60%
Lawrence Bros. New York.....3½¢
McKinney's Hinged Hanger Rail ₱ foot, 11¢.....50%
McKinney's None Better.....₱ ft. 3½¢
McKinney's Standard.....₱ ft. 4 ¢
Myers' Stayon Track.....50&10%
Safety Door Hanger Co.'s Storm King Safety.....60%
Safety Door Hanger Co.'s U.S. Standard.....60%
Smith's Wrought Bracket, Plain.....3½¢
Smith's Special.....4½¢
Smith's Never Jump, per ft. 11¢.....50%
Smith's Plain Steel.....30%
Smith's Milled Steel.....4½¢
Stowell's Cast Rail.....₱ ft. 1¾¢
Stowell's Steel Rail, Plain.....2¾
Stowell's Wrought Bracket, 1 3-16 in.... ₱ ft. 3¢
Stowell's Wrought Bracket, 1¼x3-16... ₱ ft. 7¢
Swett's Hylo, per ft. 11¢.....50&10%
Swett's P. L. B. Steel Rail, ₱ 100 ft. $3.00

Rakes—

Net Prices, Malleable Rakes:

	10	*12*	*14*	*16-tooth*
Shank	$1.50	1.60	1.75	1.85
Socket	$1.65	1.80	1.95	2.10

Steel, Garden and Gravel, Aug. 1, '99 List.....70%
Weldless Steel.....75&5%
Malleable Iron, Garden.....70&10%
Lawn Rakes, Metal Head, per doz.
20 teeth.....$3.25@3.50
24 teeth.....$3.50@3.75
Fort Madison Red Head Lawn.....$2.25
Fort Madison Blue Head Lawn.....$2.70
Jackson Lawn, 29 and 30 teeth, ₱ doz., net, $4.25
Kohler's:
Lawn Queen, 20-tooth, ₱ doz.....$3.45
Lawn Queen, 24-tooth, ₱ doz 3.60
Paragon, 20-tooth, ₱ doz $2.75
Paragon, 24-tooth, ₱ doz.....$3.00
Steel Garden, 14-tooth, ₱ doz.....$2.80
Malleable Garden, 14-tooth, ₱ doz..$2.00

Rasps, Horse—

Disston's.....75%
Heller Bros.....70&5&20&10&5%
McCaffrey's American Standard..... 60&10&5%
New Nicholson.....A..70&10@75%
See also *Files.*

Razors—

Borasic.....50 & 10%
Fox Razors, No. 42, ₱ doz. $20.00 } dis.
Fox Razors, No. 44, ₱ doz, $20.00 } 40%
Fox Razors, No. 52, Platina, ₱ doz. } dis. ~5.00
Red Devil.....60%
Silberstein:
Carbo Magnetic.....$18.00
Griffon, No. 65.....$15.00
Griffon, No. 00.....$12.00
All other Razors.....40%

Safety Razors—

Safety Razors.....40%
New Gem, in Tin Boxes.....₱ doz. $12.00
New Gem, Extra Blades.....₱ doz. $8.35
Gem Outfits (Razor, Strop, etc.)..... ₱ doz. $25.60
Complete Razor, extra Blade in Leather Case.....₱ doz. $27.00
Silberseein.....40%

Reels— Fishing—

Bishop's Independent Fish Reel Spooler, ₱ doz.....$30.00
Hendryx:
M 6, Q 6, A 6, B 6, M 9¼, M 16, Q 16, A 16, B 16, 4068, Rubber Populo, Nickeled Populo.....20%
Aluminum, German Silver, Bronze.25%
1240 N, 124 N.....20%
3004 N, 06 N, 6 RM, G 9.....25%
4 N, 6 PN, 24 N, 26 PN.....20%
3904 P.....33⅓%
3904 PN.....33⅓%
0924 N.....33⅓%
02084 N.....33⅓%
002904 PN.....33⅓%
802 N.....33⅓%
986 PN, 2904 N, 974 PN.....25%
5009 PN, 5009 N.....20%
Competitor, 102 P, 102 PN, 202 P, 202 PN, 10 PR, 202 PR.....25%
304 P, 304 PN, 00304 P, 00304 PN..33⅓%

Registers—*List July 1, 1903.*

Black Jap
White Jap
Bronzed
Nickel Plated
Electro Plated
} *75@75&10*

Registers, Cash—

Sun, No. 10, Metal Cabinet.....$30.00
Sun, No. 10, Wood Cabinet.....$25.00

Revolvers—

Single Action.....85@90c
Double Act'n, except 44 cal......$1.90
Double Action, 44 caliber.....$2.05
Automatic.....$3.60
Hammerless.....$4.10
Note.—Jobbers frequently cut the above prices of manufacturers for small trade.

Riddles, Hardware Grade

16 in., per doz.....$2.25@$2.50
17 in., per doz.....$2.50@$2.75
18 in., per doz.....$2.75@$3.00

Rings and Ringers—Bull Rings—

	2	*2½*	*3 Inch*
Steel	$0.70	0.75	0.80 *doz.*
Copper	1.00	1.15	1.40 *doz.*

Hog Rings and Ringers—

Hill's Rings....gro. boxes, $4.35@4.50
Hill's Ringers, Gray Iron. doz. 50@55c
Hill's Ringers, Mal. Iron, doz. 70@75c
Blair's Rings.....per gro. $5.00@5.25
Blair's Ringers...per doz. $0.60@ .65
Brown's Rings....per gro. $5.25@5.50
Brown's Ringers..per doz. $0.65@ .70

Rivets and Burrs—

Copper.....60@60&5%
Iron or Steel.....75&5@75&10%

Rollers—

Acme, Stowell's Anti-Friction.....50%
Barn Door, Sargent's list.....60%
Cronk's Stay.....66⅔%
Cronk's Brinkerhoff.....66⅔%
Lane's Stay.....33⅓&5%
Stowell's Barn Door Stay.....₱ doz. $1.00

Rope—

Manila, 7-16 in. diam, and larger, tarred or untarred.....lb. .. @12 c
Manila, Hay, Hide and Bale Ropes, Medium and Coarse.....lb. .. @12 c
Sisal, 7-16 in. diam. and larger:
Mixed.....lb. .. @ 8 c
Pure.....lb. .. @ 9¼c
Sisal, Hay, Hide and Bale Ropes, Medium and Coarse:
Mixed.....lb. .. @ 8 c
Pure.....lb. .. @ 9¼c
Sisal, Tarred, Medium Lath Yarn:
Mixed.....lb. .. @ 7½c
Pure.....lb. .. @ 8¼c
Cotton Rope: —Lb.—
Best.....¼-in. and larger.. 15@16c
Medium..¼-in. and larger.. 16@18c
Com....¼-in. and larger..12@13c
Jute Rope:
Thread No. 1, ¼-in. and up, lb. 6 c
Thread No. 2, ¼-in. and up, lb. 5½c
Old Colony Manila Transmission Rope, ₱ ft. 17½¢

Wire Rope—

Galvanized.....47½@50%
Plain.....55&5%

Ropes, Hammocks—

Covert Mfg. Co.:
Jute.....40&5%
Sisal.....20%
Covert Saddlery Works.....60&5%

Rules—

Boxwood.....60&10@10%
Ivory.....35@10@35&10@5%
Chapin-Stephens Co.:
Boxwood.....60@60&10%
Ivory.....35@35&10&10%
Miscellaneous.....50@50&10&10%
Combination.....55@55&10%
Stationers'.....10@10&10%
Lufkin's Steel.....50&10%
Lufkin's Lumber.....60&10%
Stanley R. & L. Co.:
Boxwood.....60@60&10%
Ivory.....35@35&10&10%
Upson Nut Co.:
Boxwood.....60@60&10%
Ivory.....35&10@35&10&10%

Sash Locks—See *Locks, Sash*

Sash Weights—

See *Weights, Sash.*

Sausage Stuffers or Fillers—See *Stuffers or Fillers, Sausage.*

Saw Frames—See *Frames, Saw*

Saw Sets—See *Sets, Saw.*

Saw Tools—See *Tools, Saw.*

Saws—

Atkins:
Circular.....50%
Band.....50&10@60%
Cross Cuts.....35&5%
Mulay, Mill and Drag.....50%
One-Man Saw.....40%
Wood Saws.....40%
Hand, Compass, &c.....40%
Chapin-Stephens Co.:
Turning Saws and Frames....30@30&10%
Diamond Saw & Stamping Works:
Sterling Kitchen Saws.....30&10&5%
Disston's:
Circular, Solid and Inserted Tooth..50%
Band, 3 to 14 in. wide.....60%
Band, ¼ to 2¾.....70%
Crosscuts.....45%
Narrow Crosscuts.....50%
Mulay, Mill and Drag.....50%
Framed Woodsaws.....35%
Woodsaw Blades.....35%
Woodsaw Rods.....25%
Hand Saws, Nos. 12, 99, 9, 16, d100, D8, 120, 79, 77, 8.....25%
Hand Saws, Nos 7, 107, 107½, 3, 1, 0, 00, Combination.....30%
Compass, Keynole, &c.....25%
Butcher Saws and Blades.....35%
C. E. Jennings & Co.'s.:
Back Saws.....35&10%
Butcher Saws.....30&10%
Compass and Key Hole Saws.35&5&10%
Framed Wood Saws.....30&10%
Hand Saws.....20&2½&10%
Wood Saw Blades.....30&10%
Millers Falls:
Butcher Saws.....15&10%
Star Saw Blades.....15&10%
Peace & Richardson's Hand Saws.....30%
Simonds':
Circular Saws.....50%
Crescent Ground Cross Cut Saws..35%
One-Man Cross Cuts.....40&10%
Gang Mill, Mulay and Drag Saws..50%
Band Saws.....50%
Back Saws.....25&7½%
Butcher Saws.....35@35&7½%
Hand Saws.....25@25&7½%
Hand Saws, Bay State Brand.....45%
Compass, Keyhole, &c .....25@25&7½%
Wood Saws.....35@35&7½%
Wheeler, Madden & Clemson Mfg. Co.'s Cross Cut Saws.....50%

Hack Saws—

Atkins' Hack Saw Blades A A A.... 25%
Disston:
Concave Blades.....25%
Keystone.....40%
Hack Saw Frames.....30%
Fitchburg File Works, Tue Best.....25%
C. E. Jennings & Co.'s:
Hack Saw Frames, Nos. 175, 180..... 35&5&10%
Hack Saws, Nos. 175, 180, complete..... 35&5&10%
Goodell's Hack Saw Blades.....40%
Griffin's Hack Saw Frames .. 35&5&10%
Griffin's Hack Saw Blades.....35&5&10%
Star Hack Saws and Blades.....15&10%
Sterling Hack Saw Blades.....35%
Sterling Hack Saw Frames .... 90&10&5%

Scroll—

Barnes' No. 7, $15.....25%
Barnes' Scroll Saw Blades.....40%
Barnes' Velocipede Power Scroll Saw, without boring attachment, $18; with boring attachment, $20.....20%
Lester, complete, $10.00.....15&10%
Rogers, complete, $4.00.....15&10%

Scalers, Fish—

Bishop's Lightning.....₱ doz. $3.00
Covert's Saddlery Works .....60&10%

Scales—

Family, Turnbull's.....50@50&10%
Counter:
Hatch, Platform, ½ oz to 8 lbs. doz. $5.50
Two Platforms, ½ oz to 8 lbs. doz. $16
Union Platform, Plain...$1.70@1.90
Union Platform, Striped $1.85@2.15
Chatillon's:
Eureka.....25%
Favorite.....40%
Grocers' Trip Scales.....50%
Chicago Scale Co.:
The "Little Detective," 25 lbs.....50%
Union or Family No. 2.....60%
Portable Platform (reduced list).....30%
Wagon or Stock (reduced list)....25@35%
Pelouze Scales—Household, Counter, Candy, Ice, Postal, Computing.....50%
"The Standard" Portables.....50%
"The Standard" R. R. and Wagon.....50%

Scrapers—

Box, 1 Handle.....doz. $2.00@2.25
Box, 2 Handle.....doz. $2.60@2.85
Ship Light, $2.00; Heavy, $4.50
Adjustable Box Scraper (S. R. & L. Co.) $6.00.....30@30&10%
Chapin-Stephens Co., Box.....50@50&10%

Screens, Window, and Frames—

Flyer Pattern Screens...60&5@60&5&2½%
Maine Screen Frames.....40&10&5%
Perfection Screens.....60&5@60&5&2½%
Phillips' Screen Frames..60&5@60&5&2½%
Porter's:
Fairview Screens.....60&5@60&5&2½%
Hummer Screens.....60&5@60&5&2½%
Klondike Screens.....60&5@60&5&2½%
See also *Doors.*

Screws—Bench and Hand—

Bench, Iron..doz. 1 in., $2.50@2.75 : 1⅛, $3.00@3.25: 1¼, $3.50@3.75
Bench, Wood, Beech....doz. 30@30&5
Hand, Wood.....30@30&5%
R. Bliss Mfg. Co., Hand.....30%
Chapin-Stephens Co., Hand.....30@30&10%
Ohio Tool Co., Bench and Hand.....30%

Coach, Lag and Hand Rail—

Lag, Common Point, list Oct. 1, 99.....50@5%
Coach and Lag, Gimlet Point, list Oct. 1, '99.....30%
Hand Rail, list Jan. 1, '81..70&10@75%

Jack Screws—

Standard List.....75&10@30&5%
Millers Falls.....50&10&10%
Millers Falls, Roller.....50&10%
P., S. & W.....50@50&5%
Sargent.....70%

Machine—

List Jan. 1, '98.
Flat or Round Head, Iron.50@50&10%
Flat or Round Head, Brass50@50&10%

Set and Cap—

Set (Iron or Steel).....75% } *Extra*
Sq. Hd. Cap.....70% } *10&5*
Hex. Hd. Cap.....70% } *often*
Rd. or Fillister Hd. Cap 65% } *given.*

Wood—

List July 23, 1903.
Manufacturers' printed discounts :
Flat Head, Iron.....87½&10@...%
Round Head, Iron.....85&10@....%
Flat Head, Brass.....85&10@....%
Round Head, Brass.....80&10@....%
Flat Head, Bronze....77½&10@....%
Round Head, Bronze.....75&10@...%
Drive Screws.....87½&10%

Scroll Saws—See *Saws, Scroll.*

Scythes—

Per doz.
Clipper Pattern, Grass...$4.25@$5.00
Full Polished Clipper.....$4.75@$5.50
Grain.....$7.00@$7.50
Clipper, Grain.....$7.75@$8.25
Weed and Bush.....$4.50@$5.00

Seeders— Raisin—

Enterprise.....25@30%

Sets— Awl and Tool—

Brad Awl and Tool Sets :
Wood Hdle., 10 Awls doz. $2.00@2.25
Wood Hdle., 14 Awls, 6 Tools doz. $3.50@2.60
Aiken's Sets, Awl and Tools :
No. 20, ℔ doz. $10.00.....50&10&10%
Fray's Adj. Tool H'dle...Nos. 1, $12; 2, $18; 3, $12; 4, $9; 5, $7.....50%
C. E. Jennings & Co.'s Model Tool Holders.....30&10%
Millers Falls Adj. Tool H'dle, No. 1, $12; No. 4, $12; No. 5, $18 .... 15&10%
Stanley's Excelsior :
No. 1, $7.50 ; No. 2 $4.00; No. 3, $5.50.....30@30&10&10%

Garden Tool Sets—

Ft. Madison, Three Pieces, Hoe, Rake and Shovel.....℔ doz. sets.....$9.00

Nail—

Square.....per gro. $2.25@2.50
Round, Blk. and Pol., assorted..... gro. $1.80@2.00
Octagon.....gro. $1.50@3.75
Buck Brothers.....37½%
Cannon's Diamond Point, ℔ gr. $12..25%
Mayhew's.....per gro. $9.00
Snell's Corrugated, Cup Pt. per gro. $7.50
Snell's Knurled, Cup Pt....per gro $7.50

Rivet—

Regular list.....70&10@75%

Saw—

Aiken's:
Genuine.....50&10%
Imitation.....50&10%
Atkin's:
Criterion.....40%
Adjustable.....40%
Bemis & Call Co's.:
Cross Cut.....30%
Hammer, new Pat.....45%
Plate.....20%
Spring Hammer.....30%
Disston's Star and Monarch.....35%
Morrill's No. 1, $15.00.....50%
Nos. 3 and 4, Cross Cut, $10.63.....50%
No. 5, Mill, $30.00.....50%
Nos. 10, 11, 95, $15.63.....30%
No. 1 Old Style, $10.00.....30%
Special, $16.25.....30%
Giant Royal, Cross Cut .....℔ doz. $8.50
Royal, Hand.....℔ doz. $5.00
Taintor Positive.....℔ dos $6.75

Shaving—

Fox Shaving Sets, No. 30, per doz, $24.00 net

Sharpeners, Knife—

Chicago Wheel & Mfg. Co.....65%

Shaves Spoke—

Iron.....doz. $1.00@1.15
Wood.....doz. $1.75@2.00
Bailey's (Stanley R. & L. Co).....30@30&10&10%
Chapin-Stephens Co .....30@30&10&10%
Goodell's, ℔ doz. $9.00.....15&10%
Wood's F1 and F2.....50%

Shears—

	7	*8*	*9 in.*
Cast Iron...			
Best	*$16.00*	*18.00*	*20.00 gro.*
Good.....	*$13.00*	*15.00*	*17.00 gro.*
Cheap.... $5.00		*6.00*	*7.00 gro.*

Straight Trimmers, &c.:
Best quality, Jap.....70@70&10%
" Nickel.....60@60&10%
Fair qual. Jap.....80@80&5%
" Nickel.....75@75&10%
Tailors' Shears.....40@40&10%
Acme Cast Shears.....40@40&5%
Heinisch's Tailors' Shears.....40%
Wilkinson's Hedge .....1900 list 45%
Wilkinson's Branch, Lawn and Border.....40%
Wilkinson's Sheep .....1900 list. 50%

Tinners' Snips—

Steel Blades .....30&5@30&10
Steel Laid Blades .....40&10@50%
Forged Handles, Steel Blades, Berlin .....40@40&10%
Heinisch's Snips.....40%
Jennings & Griffin Mfg. Co.'s, 6¼ to 10 inch .....40&7½&10%
Niagara Snips 40%
P., S & W. Co. 30%
Triumph Pipe Shear.....℔ doz. 9.00

Pruning Shears and Tools—

Cronk's Grape Shears.....33⅓%
Cronk's Pruning Shears.....33⅓%
Disston's Combined Pruning Hook and Saw, ℔ doz. $18.00.....25%
Disston's Pruning Hook, ℔ doz. $12.00 .....25%
John T. Henry Mfg. Co.:
Pruning Shears, all grades.....40@40&5%
Orange Shears.....50&10@50&20%
Grape .....40&10@50%
Tree Pruners.....75%
P., S. & W. Co.....33⅓%

Sheaves—Sliding Door—

Stowell's Anti-Friction 50%
Patent Roller Hatfield's, Sargent's list, 70&10%
Reading.....50%
R. & E. list.....33⅓%
Wrightsville Hatfield Pattern.....50%

Sliding Shutter—

Reading list.....50%
R. & E. list.....33⅓%
Sargent's list.....50&10%

Shells— Shells, Empty—

Brass Shells, Empty :
First quality, all gauges.....60&5%
Climax, Club, Rival, 10 and 12 gauge.. 65&5%
Paper Shells, Empty :
Acme, Ideal, Leader, New Rapid, Magic, 10, 12, 16 and 20 gauge..25&5%
Blue Rival, New Climax, Challenge, Monarch, Defiance, Repeater, Yellow Rival, 10, 12, 16 and 20 gauge.....20%
Climax, Union, League, New Rival 10 and 12 gauge.....25%
Climax, Union, League, New Rival, 14, 16 and 20 gauge ($7.50 list) ..20%
Expert, Metal Lined and Pigeon, 10, 12, 16 and 20 gauge.....33⅓&5%
Robin Hood, Low Brass.....30&10%
Robin Hood, High Brass.....30&10%

Shells, Loaded—

Loaded with Black Powder 40%
Loaded with Smokeless Powder, medium grade.....40&5%
Loaded with Smokeless Powder, high grade.....40&10&10%
Robin Hood Smokeless Powder:
Robin Hood, Low Brass.....50%
Comets, High Brass.....50&10&5%

Shoes, Horse, Mule, &c.—

F. o. b., Pittsburg:
Iron.....per keg $4.00
Steel.....per keg 3.85
Burden's, all sizes, ℔ keg.....$3.90

Shot—

Drop, up to B, 25-lb. bag.....$1.60
Drop, B and larger, per 25-lb. bag $1.85
Buck, 25-lb. bag.....$1.85
Chilled, 25-lb. bag.....$1.85

Shovels and Spades—

Association List, Nov. 15, 1902....40%

Sieves and Sifters—

Hunter's Imitation, gro. $10.50@11.00
Buffalo Metallic tinned, S. S. Co., ℔ gr.:

14&16	16&18	18&20
$13.20	$13.50	$14.40

National Mfg. Co.:
Victor.....per gro. $12.00
Surprise.....per gro. $11.00
No Name.....per gro. $11 00
Shaker Barler's Pat.) Flour Sifters.. ℔ doz., $2.00.....20%

Sieves, Tin Rim—

Per dozen.

Mesh.....	*14*	*16*	*18*	*20*
Black, full size...	*$1.20*	*1.25*	*.30*	*1.35*
Plated, full size .	*$1.30*	*1.35*	*1.40*	*1.45*
Black, scant....	*....*	*$6.45*	*1.00*	*1.05*

Sieves, Wooden Rim—

Nested, 10, 11 and 12 Inch.
Mesh 18, Nested, doz.....$0.90@0.95
Mesh 20, Nested, doz..... 1.00@1.05
Mesh 24, Nested, doz ..... 1.30@1.40

Sinks—

Cast Iron—

Standard list.....60@60&10%
NOTE.—*There is not entire uniformity lists used by jobbers.*

Skeins, Wagon—

Cast Iron.....75@75&10%
Steel.....40@40&10%

Slates, School—

Factory Shipments.
"D" Slates.....40&10%
Noiseless Slates.....60&5 tens

Slaw Cutters—See *Cutters.*

Slicers, Vegetable—

Sterling No. 10, $2.00.....33⅓

Snaps, Harness—

German.....40@40&10%
Covert Mfg. Co.:
Derby.....30&5&2%
High Grade.....45%
Jockey.....30&10%
Trojan.....45%
Yankee.....30&5&2%
Yankee, Roller.....30&5&2%
Covert's Saddlery Works:
Crown.....60%
German.....60%
Model.....60%
Triumph.....60%
Oneida Community Solid Swivel.....60%
Sargent's Patent Guarded .....60%&10%

Snaths—

Scythe.....45%

Snips, Tinners'—See *Shears.*

Spoons and Forks—

Silver Plated—

Good Quality..... 50&10@60&5%
Cheap..... 60@60&10%
International Silver Co.
1847 Rogers Bros. and Rogers & Hamilton.....40&10%
Rogers & Bro., William Rogers Eagle Brand.....50&10%
Anchor, Rogers Brand.....60%
Wm. Rogers & Son.....60&10%

Miscellaneous—

German Silver..... 60@60&5%
Cattaraugus Cutlery Co.:
Yukon Silver.....30%

Tinned Iron—

Teas.....per gro. 45@50c
Tables..... per gro. 90c@$1.00

Springs— Door—

Chicago (Coil).....40&10%
Gem (Coil).....20%
Reliance (Coil).....40&10%
Star (Coil).....30%
Torrey's Rod, 39 in.....℔ dos. $1.10
Victor (Coil).....50&10&10%

Carriage, Wagon, &c.

1¼ in. and Wider :
Black or ½ Bright, lb.....4¾@5 c
Bright, lb. .....5¼@5½c
Painted Seat Springs :
1½ x 2 x 26, per pr.....50@55c
1½ x 2 x 28 per pr.. ..... 60@65c
1½ x 3 x 28 and narrower, per pr. 80@85c

Sprinklers, Lawn—

Enterprise.....25@30%
Philadelphia No. 1, ℔ doz. $13; No. 2, $15; No. 3, $24.....30%

Squares—

Nickel plated.... } *List Jan. 5, 1900.*
Steel and Iron... } *70&10@70&10&10%*
Rosewood Hdl Try Square and T-Bevels .....60&10&10@70%
Iron Hdl. Try Squares and T-Bevels. 50&10@50&10&10%
Disston's Try Sq. and T-Beve's.....70%
Winterbottom's Try and Miter..... 40&10@40&10&10%

Squeezers— Lemon—

Wood, Common, gro., No. 0, $5.25 @$5.50 : No. 1, $6.25@$6.50.
Wood, Porcelain Lined :
Cheap .....doz. $1.00
Good Grade.....doz. $1.25
Tinned Iron.....doz. $0.75@1.25
Iron, Porcelain Lined.....doz. $1.75

Staples—

Barbed Blind. .....lb. 6@6½c
Electricians', Association list..... 80&10&10&10%
Fence Staples, Plain $2.25; Galvanized.....$2.55
Poultry Netting, Staples....per lb.. 3¼@3½c
Grand Crossing Tack Co.'s list....80&10%

Steels, Butchers'—

Dick's.....30%
Foster Bros'.....30%
C. & A. Hoffmann's.....40%

Steelyards..... .....30@30&10%

Stocks and Dies—

Blacksmiths'.....50@50&10%
Curtis Reversible Ratchet Die Stock.25%
Derby Screw Plates 25%
Gardner Die Stocks No. 1.....50%
Gardner Die Stocks, larger sizes.....40%
Green River.....25%
Lightning Screw Plate.....25%
Little Giant.....25%
Reece's New Screw Plates.....25@30%

Stone—

Scythe Stones—

Chicago Wheel & Mfg. Co:
Gem Corundum, 10 inch, $3.00 per gro., 12 inch, $10.80
Norton Emery Scythe Stones:
Less than gross lots.....℔ gro. $9.00
One gross or more.....℔ gro. $7.20
Lots of 10 gross or more....℔ gro $6.00
Pike Mfg. Co. 1901 list:
Black Diamond S. S....℔ gro. $12.00
Lamoille S. S .....℔ gro $11.00
White Mountain S. S....℔ gro. $9.00
Green Mountain S. S....℔ gro. $6.00
Extra Indian Pond S. S.℔ gro. $7.50
No. 1 Indian Pond S. S..℔ gro. $7.00
No. 2 Indian Pond S. S..℔ gro. $4.50
Leader Red End S. S....℔ gro $4.50
Balance of 1901 list 33⅓&5%

Oil Stones, &c.

Chicago Wheel & Mfg. Co., 1901 list:
Gem Corundum Oil, Double Grit.....50%
Gem Corundum Axe, Single or Double Grit.....35%
Gem Corundum Slips.....55%
Gem Corundum Razor Hones.....50%
Pike Mfg. Co. 1901 list: ℔ lb
Arkansas Stone, No. 1, 3 to 5¼ in. $2.80
Arkansas Stone, No. 1, 5¼ to 8 in. $3.50
Arkansas Slips No. 1 .....$4.00
Lily White Washita 4 to 8 in.....60¢
Rosy Red Washita, 4 to 8 in.....60¢
Washita Stone, Extra, 4 to 8 in..50¢
Washita Stone, No. 1, 4 to 8 in..40¢
Washita Stone, No. 2, 4 to 8 in..30¢
Lily White Slips.....90¢
Rosy Red Slips.....90¢
Washita Slips, Extra.....80¢
Washita Slips, No. 1.....70¢
India Oil Stones (entire list) 33⅓%

Hindostan No 1, Regular....℔ lb 8¢
Hindostan No. 1 Small.....℔ lb 10¢
Axe Stones (all kinds) 40%
Turkey Oil Stones, ex. 5 tos in. ℔ lb 80¢
Queer Creek Stones, 4 to 8 in.....20¢
Queer Creek Slips.....40¢
Sand Stone.....5¢
Belgian, German and Swaty Razor Hones.....50%
Natural Grit Carving Knife Hones, ℔ doz.....$3.00
Quick Edge Pocket Knife Hones, ℔ doz.....$6.00 } 40%
Mounted Kitchen Sand Stone, ℔ doz.....$1.50

Stoners— Cherry—

Enterprise.....25@30%

Stops, Bench—

Millers Falls.....15&10%
Morrill's...℔ doz., No. 1, $10.00.....50%
Morrill's, No. 2, $12.50.....50%
Whipple's Combination.....℔ doz. $2 50

Door—

Chapin-Stephens Co.....60@60&10%

Plane—

Chapin-Stephens Co.....20%

Straps— Box—

Cary's Universal, case lots....20&10&10%

Hame—

Covert's Saddlery Works.....60&10%

Stretchers, Carpet—

Cast Iron, Steel Points....doz. 55@60¢
Socket.....doz. $1.75
Excelsior Stretcher and Tack Hammer Combined per doz. $6.....20%

Stuffers, Sausage—

Enterprise Mfg. Co.....25@25&7½%
National Specialty Mfg. Co., list Jan. 1, 1902.....30&5%

Sweepers, Carpet—

National Sweeper Co.:	Per doz.
Auditorium, Roller Bearing (36 in. case), Nickel	$54.00
Mammoth, Roller Bearing (30 in case), Nickel	$60.00
Marion, Roller Bearing, regular finishes, full Nickel	$24.00
Marion Queen, Roller Bearing, full Nickel	$24.00
Monarch, Roller Bearing, Nickel	$22.00
Monarch, Roller Bearing, Jap'ned	$20.00
Transparent, Roller Bearing, Plate Glass Top, Nickel	$36.00
Monarch Extra, Roller Bearing, (17-inch case), Nickel	$36.00
Monarch Extra, Roller Bearing (17-inch case), Japanned	$33.00
National Queen, Fancy Veneers	$27.00
Perpetual, Regular Bearings, Nkl.	$20.00
Perpetual, Regular Bearings, Jap.	$18.00

NOTE.—*Rebates: 30c per dozen on three-dozen lots; $1 per dozen on five-dozen lots ; $2 per dozen on ten-dozen lots. $2.50 per dozen on twenty-five-dozen lots.*

Tacks, Brads, &c.—

List Jan. 15, '99.
Carpet Tacks.....90¢&10¢@10¢....%
American Cut Tacks....90¢&25@....%
Swedes Iron Tacks. 90¢&30¢10¢&5@....%
Swedes Upholsterers' Tacks..... 90¢&45¢10¢&5@....%
Gimp Tacks.....90¢&45¢&10@....%
Lace Tacks.. .....90¢&45¢&10@....%
Trimmers' Tacks..90¢&30¢10¢&5@....%
Looking Glass Tacks. 70¢&10¢&5@....%
Bill Posters' and Railroad Tacks... 90¢&45¢@10....%
Hungarian Nails ....80¢&30¢&5@....%
Common and Patent Brads..... 80¢&10¢&5@....%
Trunk and Clout Nails..80¢&10@....%

NOTE.—*The above prices are for Straight Weights.* An extra 5% is given Star Weights** and an extra 10&5% on Standard Weights.****

Miscellaneous—

Double Pointed Tacks. 90 & 6 tens & 5%
Steel Wire Brads, R. & E. Mfg. Co 's list.. 50&10&10%

See also *Nails, Wire.*

Tanks, Oil—

	Each.
Emerald, S. S. & C.	30-gal $3.25
Emerald, S. S. & C.	60-gal., $4.00
Queen City S. S. & Co.,	30-gal. $3.65
Queen City S. S. & Co.,	60-gal. $4.50

Tapes, Measuring—

American Asses' Skin.....40¢&10@50%
Patent Leather.....25@30¢&5%
Steel.....40@40¢&10%
Chesterman's.....25@25¢&5%
Eddy Asses' Skin.....40&10¢&50%
Eddy Patent Leather.....25@30&5%
Eddy Steel.....40@40&10%
Keuffel & Esser Co., Steel and Metallic, Lower list, 1899.....35%
Lufkin's Steel.....33⅓@35%
Lufkin's Metallic.....30@30&5%

Teeth, Harrow—

Steel Harrow Teeth, plain or headed, ⅝-inch and larger, per 100 lbs..$5.00

Thermometers—

Tin Case.....30¢&10@30¢&10¢&5%

Ties, Bale—Steel Wire.

Single Loop.....80¢&2½
Monitor, Cross Head, Etc.....70%

Brick Ties—

Niagara Brick Ties.....20&10%

Tinners' Shears, &c.—

See *Shears, Tinners', &c.*

Tinware—

Stamped, Japanned and Plated, sold very generally at net prices.

Tips, Safety Pole—

Covert's Saddlery Works.....60&10%

Tire Benders, Upsetters, &c.—See *Benders and Upsetters, Tire.*

Tools—
L. & I. J. White ..... 20@20&5%

Coopers'—
Hay—
Myers' Hay Tools 50%
Stowell's Hay Carriers 50%
Stowell's Hay Forks 50%
Stowell's Fork Pulleys 50%

Saw—
Atkins' Cross Cut Saw Tools 40%
Simonds' Improved 33⅓%
Simonds' Crescent 25%

Ship—
L. & I. J. White 25%

Transom Lifters—
See *Lifters, Transom.*

Traps— Fly—
Balloon, Globe or Acme ..... doz. $1.15@1.25; gro. $11.50@12.00
Harper, Champion or Paragon ..... doz. $1.25@1.40; gro. $13.00@13.50

Came—
Oneida Pattern ..... 75&10@75&10&5%
Newhouse ..... 45@45&5%
Hawley & Norton ..... 65@65&5%
Victor (Oneida Pattern) ..... 75@75&5%
O.C. Jump (Blake Pattern) 60&5@60&10%

Mouse and Rat—
Mouse, Wood, Choker, doz. holes ..... 8½@9c
Mouse, Round or Square Wire ..... doz. 85@90c
Marty French Rat and Mouse Traps (Genuine):
No. 1, Rat, Each $1.12½; ₱ doz. $12.00
No. 3, Rat, ₱ doz. $6.00; case of 50 $5.25 doz.
No. 3½, Rat, ₱ doz. $4.75; case of 72 $4.25 doz.
No. 4, Mouse, ₱ doz. $3.50; case of 7 $2.75 doz.
No. 5, Mouse, ₱ doz. $2.75; case of 150 $2.25
Schuyler's Rat Killer, No. 1, ₱ gr. $30.00
No. 2, ₱ gr. $30.00; Mouse, No. 3, $18.00 ..... 50%
J. M. Mast Mfg. Co.: Per gro.

	Mouse.	Rat.
Blizzard	No. 12, $3.00	No. 1, $9 50
Old Nick	No. 30, 2.22	No. 2, 8.40
Joker	No. 5, 2.10	No. 3, 8.40

Imp'd Snap Shot, Mouse, per gro., 2 hole, $2.40.
Imp'd Snap Shot, Mouse, per gro., 4 hole, $4.20.

Trimmers. Spoke—
Bonney's Nos. 1 and 2 ..... 33⅓%
Wood's E I 50%

Trowels—
Disston Brick and Pointing 30%
Disston Plastering 25%
Disston "Standard Brand" and Garden Trowels 35%
Kohler's Steel Garden Trowels, 5 in. ..... ₱ gro. $5.00
Kohler's Steel Garden Trowels, 6 in. ..... ₱ gro. $6.00
Never-Break Steel Garden Trowels ..... gro. $6.00
Rose Brick and Plastering ..... 25&5%
Woodrough & McParlin, Plastering 25%

Trucks, Warehouse, &c.—
B. & L. Block Co.:
New York Pattern ..... 50&10%
Western Pattern ..... 60&10%
Handy Trucks ..... per doz. $16.00
Grocery ..... per doz. $15.00
Daisy Stove Trucks, Improved pattern ₱ doz. $18.50
Model Stove Trucks ..... ₱ doz. $18.50

Tubs, Wash—*No. 1 2 3*
Galvanized, per doz. $5.00 5.50 6.25
Galvanized Wash Tubs (S. S. & Co.):
No. 1 2 3 10 20 30
Per doz., net $5.70 6.30 7.20 6.30 7.20 8.10

Twine—Miscellaneous—

Flax Twine—	*BC,*	*B.*
No. 9, ¼ and ½-lb. Balls	*22c@24c*	
No. 12, ¼ and ½ lb. balls	*18c@20c*	
No. 18, ¼ and ½-lb. Balls	*16c@18c*	
No. 24, ¼ and ½-lb. Balls	*16c@18c*	
No. 36, ¼ and ½-lb. Balls	*15c@17c*	
Chalk Line, Cotton, ¼-lb Balls		*30c*
Cotton Mops, 6, 9, 12 and 15 lb. to doz		*10@12c*
Cotton Wrapping 5 Balls to lb ..... according to quality		*16c@25c*
American 2-Ply Hemp, ¼ and ½-lb. Balls		*13@14c*
American 3 Ply Hemp, 1-lb. Balls		*13@14c*
India 2-Ply Hemp, ¼ and ½-lb. Balls (Spring Twine)		*9c*
India 2-Ply Hemp, 1-lb. Balls		*9c*
India 3-Ply Hemp, 1½-lb. Balls		*8c*
2, 3, 4 and 5-Ply Jute, ½-lb. Balls		*9@10c*
Mason Line, Linen, ½-lb. Balls		*16c*
No. 265 Mattress, ¼ and ½-lb Balls		*37c*
Wool, 3 to 6 ply		*5¾@6c*

Vises—
Solid Box ..... 50&10@60%

Parallel—
Athol Machine Co:
Simpson's Adjustable 40%
Standard 40%
Amateur 25%
Bonney's 33⅓%
Columbian Hdw. Co. 40%
Emmert Universal:
Pattern Makers' No. 1 ..... $15.00
Pattern Makers' No. 2 ..... $12.50
Machinist and Tool Makers' No. 4 $12.50
Fisher & Norris Double Screw ..... 15&10%
Hollands':
Machinists' ..... 40@40&5%
Keystone ..... 65&5@70%
Lewis Tool Co. ..... 20@30%
Merrill's 30%
Miller's Falls ..... 60&10%
Massey Vise Co.:
Clincher 40%
Perfect 30%
Lightning Grip 20%
Parker's:
Victor ..... 20@25%
Regulars ..... 20@25%
Vulcan's ..... 40@45%
Combination Pipe ..... 55@60%
Prentiss ..... 20@25%
Sargent's 40%
Smith & Hemenway Co.:
Machinists 40%
Jewelers 33⅓%
Snediker's X. L. 33⅓%
Stephens' 33⅓%

Saw Filers'—
Bonney's, No. 1, $13; No. 3, $16 ..... 40%
Disston's D 3 Clamp and Guide, ₱ doz. $30 ..... 25%
Perfection Saw Clamps, ₱ doz. $8.00
Reading 60%
Wentworth's Rubber Jaw, Nos. 1, 2 and 3 ..... 45&50%

Wood Workers'—
Massey Vise Co.:
Lightning Grip 15%
Perfect 15%
Wyman & Gordon's Quick Action, 6 in., $6.00; 9 in., $7.00; 14 in., $8.00.

Miscellaneous—
Bignall & Keeler Combination Pipe Vise 60%
Hollands' Combination Pipe ..... 60@60&5%
Massey's Quick Action Pipe 40%
Parker's Combination Pipe:
87 Series 60%
187 Series ..... 60&5%
No. 870 ..... 40%

Wads—Price Per M.

B. E., 11 up	*60c*
B. E., 9 and 10	*70c*
B. E., 8	*80c*
B. E., 7	*80c*
P. E., 11 up	*$1.00*
P. E., 9 and 10	*1.25*
P. E., 8	*1.50*
P. E., 7	*1.50*
Ely's B. E., 11 and larger	*$1.70@1.75*
Ely's P. E., 12 to 20	*$3.00@3.25*

Dis. 15%

Ware, Hollow—
Cast Iron, Hollow—
Stove Hollow Ware:
Enameled ..... 55&10@60%
Ground ..... 60&10@65%
Plain or Unground ..... 65&10@70%
Country Hollowware per 100 lbs., $2 50
White Enameled Ware:
Maslin Kettles 70%
Covered Ware:
Tinned and Turned 40%
Enameled 50%
See also *Pots Glue.*

Enameled—
Agate Nickel Steel Ware ..... 50&20
Agate Nickel Steel Ware, Specials ..... 60&15%
Iron Clad Ware ..... 70&10%
Lava, Enameled ..... 40&10%
Never Break Enameled 50%

Tea Kettles—
Galvanized Tea Kettles:

Inch	*6*	*7*	*8*	*9*
Each	*45c*	*50c*	*55c*	*65c*

Steel Hollow Ware.
Avery Spiders & Griddles ..... 65@65&5%
Avery Kettles 60%
Porcelained ..... 50&5@50&10%
Never Break Spiders and Griddles ..... 65&5%
Never Break Kettles 60%
Solid Steel Spiders & Griddles ..... 65&5%
Solid Steel Kettles 60%

Warmers, Foot—
Pike Mfg. Co., Soapstone ..... 40@40&10%

Washboards—
Solid Zinc: ₱ doz
Crescent, family size, bent frame $3.00
Red Star, family size, stationary protector $3.00
Double Zinc Surface:
Saginaw Globe, family size, stationary protector $2.65
Cable Cross, family size, stationary protector $2.90
Single Zinc Surface:
Naiad, familysize, open back perforated $2.40
Saginaw Globe, protector, family size, ventilated back $2.25
Brass Surface:
Brass King, Single Surface, open back $3.00
Nickel Plate Surface:
No. 1001 Nickel Plate, Single Surface $3.00

Washers—Leather, Axle—
Solid ..... 80&10@80&10&10%
Patent ..... 90@90&5%
Coil: ⅛ 1 1¼ 1¾ Inch.
11c 12c 13c 15c per box

Iron or Steel—

Size bolt	*5-16*	*⅜*	*½*	*⅝*	*¾*
Washers	*$5.10*	*4.20*	*2.90*	*2.70*	*2.50*

In lots less than one keg add ½c per lb., 5-lb. boxes add ½c to list.

Cast Washers—
Over ½ inch, barrel lots, per lb 1¾@2c

Waterers, Hog—
Improved Dewey, ₱ doz $13.00

Wedges—
Oil Finish ..... lb. 2.35@2.40c

Weights—
Hitching—
Covert Mfg. Co. ..... 40&2%
Covert's Saddlery Works ..... 60&10%

Sash—
Per ton, f.o.b. factory:
Eastern District $23.00
Western, Central and Southern Districts market unsettled, prices ranging from $19.00@20.00

Wheels, Well—
8-in.. $1.60@1.80; 10-in., $2.00@2.25; 12-in., $2.55@2.65; 14-in., $4.00@4.25

Wire and Wire Goods—
Bright and Annealed:
6 to 9 ..... 75@75&10%
10 to 18 ..... 75&5@75&10&5%
19 to 26 ..... 75&10&10@80&5%
27 to 36 ..... 75&10&7½@80&2½%
Galvanized:
6 to 9 ..... 70&5@70&10%
10 to 18 ..... 70&5@70&10%
19 to 26 ..... 72½@72½&5%
27 to 36 ..... 70@70&5%
Coppered:
6 to 9 ..... 70&5@70&10%
10 to 18 ..... 70&10@70&10&5%
19 to 26 ..... 72½&10@72½%
27 to 36 ..... 70@70&5%
Tinned:
6 to 14 ..... 72½&10@72½%
15 to 18 ..... 70&10@70&10&5%
19 to 26 ..... 65&10&10@70%
27 to 36 ..... 60@60&10%
Annealed, Steel and Tinned, on Spools ..... 70@70&10%
Brass & Copper on Spools 60@60&10%
Brass, list Feb. 26, '96 ..... 30%
Copper, list Feb. 26, '96 ..... 15%
Cast Steel Wire 50%
Wire Clothes Line, see *Lines.*
Wire Picture Cord, see *Cord.*

Bright Wire Goods—
List June 2, 1903..90&10@90&10&10%

Wire Cloth and Netting—
Galvanized Wire Netting ..... 80&10@80&10&5%
Painted Screen Cloth, per 100 ft. $1.35
Standard Galv. Hardware Grade:
Nos. 2, 2½ and 3 Mesh, sq. ft. 3c
Nos. 4 and 5 Mesh, sq. ft. 3½c
No. 6 Mesh, sq ft 3½c
No. 8 Mesh, sq ft 4c

Wire Barb—See Trade Report.

Wrenches—
Agricultural ..... 30&5@30&10%
Baxter Pat'rn S Wrenches ..... 70&5@70&10%
Drop Forged S ..... 45@45&5%
Acme ..... 60&10%
Alligator 70%
Alligator Pattern 70%
Bull Dog 70%
Bemis & Call's:
Adjustable S ..... 35&5%
Adjustable S Pipe 40%
Brigg's Pattern ..... 30&10%
Combination Black ..... 40&5%
Combination Bright 40%
Merrick's Pattern 50%
No. 3 Pipe, Bright 55%
Boardman's 33⅓%
Coes' Genuine Knife Hdl. ..... 40&10&5&5%
Coes' Genuine Steel Hdl. ..... 40&10&5&5%
Coes' Genuine Key Model ..... 40&10&5&5%
Coes' "Mechanics' ..... 40&10&10&5&5%
Donohue's Engineer ..... 40&10%
Dudly Combination ..... 50&10&5%
Dudly Pipe ..... 50&10&5%
Dudly Adjustable Pipe ..... 40&10&5%
Eagle ..... 50&10%
Elgin Wrenches 40%
Elgin Monkey Wrench Pipe Jaws 33⅓%
Gem Pocket 30%
Hercules 70%
W. & B. Machinist:
Case lots ..... 50&5%
Less than case lots 50%
Improved Pipe (W. & B.) 60%
Solid Handles, P.S. & W ..... 50@50&5%
Stillson 65%
Triumph ..... 60&10%
Vulcan Chain 50%

Fruit Jar—
T & B Fruit Jar Wrenches ..... ₱ gro $9.00
Triumph Fruit Can Wrenches, ₱ gro $9.00
Triumph Fruit Jar Holders ₱ gro $13.00

Wrought Goods—
Staples, Hooks, &c., list March 17 '92 ..... 90@90&5%

Yokes Neck—
Covert Saddlery Works Trimmed 70%
Covert Saddlery Works, Neck Yoke Centers 70%

Yokes, Ox, and Ox Bows—
Fort Madison's Farmers & Freighters' .. list net

Zinc—
Sheet ..... per 100 lbs. $6.25@6.50

PAINTS, OILS AND COLORS.

White Lead, Zinc, &c.

Lead, English white, in Oil	9½@ 9¼
Lead, American White, in Oil:	
Lots of 500 ℔ or over	@ 6¼
Lots less than 500 ℔	@ 7
in Barrels	@ 6
Lead, White, in oil, 25 ℔ tin pails, add to keg price	@ ⅛
Lead, White, in oil, 12½ ℔ tin pails, add to keg price	@ 1
Lead, White in oil, 1 to 5 ℔ assorted tins, add to keg price	@ 1½

Lead, American, Terms: For lots 12 tons and over ¼c rebate; an 1 2% for cash if paid in 15 days from date of invoice; for lots of 500 lbs. and over 2% for cash if paid in 15 days from date of invoice; for lots of less than 500 lbs. net.

Lead White, Dry in bbls	@ 6
Zinc, American, dry	₱ ℔ 4½@ 4¾
Zinc, French:	
Paris, Red Seal, dry	7¼
Paris, Green Seal, dry	9½
Antwerp Red Seal, dry	6¾
Antwerp, Green Seal, dry	8¾

Zinc, V. M. French, in Poppy Oil, Green Seal:

Lots of 1 ton and over	11¼@11¾
Lots of less than 1 ton	11¾@12

Zinc, V. M. French, in Poppy Oil, Red Seal:

Lots of 1 ton and over	10 @10½
Lots of less than 1 ton	10¼@10¾

Discounts.—French Zinc.—Discounts to buyers of 10 bbl. lots of one or mixed grades, 1%: 25 bbls., 2%; 50 bbls., 4%.

Dry Colors.

Black, Carbon	₱ ℔ 5 @10
Black, Drop, Amer	4 @ 6
Black, Drop, Eng	5 @15
Black, Ivory	16 @20
Lamp, Com	4½@ 6
Blue, Celestial	₱ ℔ 4 @ 6
Blue, Chinese	29 @ 32
Blue, Prussian	27 @30
Blue, Ultramarine	4½@15
Brown, Spanish	½@ 1
Carmine, No. 40	₱ ℔ $3.75@4.00
Green, Chrome, ordinary	3½@ 6.
Green, Chrome, pure	17 @25
Lead, Red, bbls. ½ bbls. and kegs:	
Lots 500 ℔ or over	@ 6½
Lots less than 500 ℔	@ 7
Litharge, bbls. ½ bbls. and kegs:	
Lots 500 ℔ or over	@ 6½
Lots less than 500 ℔	@ 7
Ocher, American	₱ ton $8.50@16.00
Orcher, American Golden	2½ @ 3
Orcher, French	1¾ @ 2¼
Orcher, Foreign Golden	3 @ 4
Orange Mineral, English	₱ ℔ 8¾@10½
Orange Mineral, French	10¾@11¼
Orange Mineral, German	7 @10
Orange Mineral, American	8 @ 8¼
Red, Indian, English	4½@ 8½
Red, Indian, American	3 @ 3¼
Red, Turkey, English	4 @ 6
Red, Tuscan, English	7 @10
Red, Venetian, Amer.	₱ 100 ℔ $0.50@1.50
Red Venetian, English	₱ 100 ℔ 1.25@1.75
Sienna, Italian, Burnt and Powdered	₱ ℔ 3 @ 6¼
Sienna, Ital., Raw, Powd	3 @ 6½
Sienna, American, Raw	1½@ 2
Sienna, American, Burnt and Powdered	₱ ℔ 1½@ 2
Talc, French	₱ ℔ 1 @ 1½
Talc, American	75 @1.25
Terra Alba, French	₱ 100 ℔ .95 @1.00
Terra Alba, English	.95 @1.00
Terra Alba, American No. 1	70 @80
Terra Alba, American No. 2	45 @55
Umber, Turkey, Bnt. & Pow.	₱ ℔ 2½@ 3½
Umber, Turkey, Raw & Powd.	2½@ 3½
Umber, Bnt. Amer	1½@ 2
Umber, Raw, Amer	1½@ 2
Yellow, Chrome	11 @14
Vermilion, American Lead	10 @25
Vermilion, Quicksilver, bulk	@65
Vermilion, Quicksilver, bags	@68
Vermilion, English, Import	.75 @80
Vermilion, Chinese	$0.90@1.00

Colors in Oil.

Black, Lampblack	12 @14
Blue, Chinese	36 @46
Blue, Prussian	32 @36
Blue, Ultramarine	13 @16
Brown, Vandyke	11 @14
Green, Chrome	10 @15
Green, Paris	@24
Sienna, Raw	12 @15
Sienna, Burnt	12 @15
Umber, Raw	11 @14
Umber, Burnt	11 @14

Miscellaneous.

Barytes, White Foreign,	₱ ton $17.50@20.00
Barytes Amer. floated	18.50@20.00
Barytes, Crude, No. 1	10.00@11.00
Chalk, in bulk	₱ ton 3.00@ 3.25
Chalk, in bbls	₱ 100 ℔ @ .35
China Clay, English	₱ ton 11.00@17.00
Cobalt, Oxide	₱ 100 ℔ 2.50@ ...
Whiting, Common	₱ 100 ℔ .45@ .48
Whiting, Gilders	.55@ .57
Whiting, extra Gilders'	.58@ .60

Putty.

In bladders	1¾@2½
In bulk	1½@2
In cans, 1 ℔ to 5 ℔	2½@4¼
In cans 12½ ℔ to 25 ℔	1½@2¼

Spirits Turpentine.

In Oil bbls	57 @57½¢
In machine bbls	57½@58 ¢

Glue.

Cabinet	₱ ℔ 11 @15
Common Bone	6 @ 8
Extra White	18 @24
Foot Stock, White	11 @14
Foot Stock, Brown	7 @10
German Hides	12 @18
French	10 @40
Irish	13 @16
Low Grade	8 @11
Medium White	14 @17

Gum Shellac— Cts. per lb.

Bleached, Commercial	45 @..
Bone Dried	56 @..
Button	50 @60
Diamond I	60 @..
Fine Orange	53 @58
A. C. Garnet	47 @48
D. C.	95 @..
Octagon B	57 @58
T. N.	51 @53
V. S. O.	63 @65

Animal, Fish and Vegetable Oils.

Linseed, City, raw	₱ gal. 40 @41
Linseed, City, boiled	42 @43
Linseed, State and West'n, raw	37 @38
Linseed, raw Calcutta seed	@65
Lard, Prime, Winter	55 @57
Lard, Extra No. 1	48 @51
Lard No. 2	36 @38
Cotton-seed, Crude, f.o.b mills	21½@22
Cotton-seed, Summer Yellow, prime	28½@29
Cotton-seed Summer Yellow, off grades	27 @28
Sperm, Crude	60 @..
Sperm, Natural Spring	60 @62
Sperm, Bleached Spring	62 @63
Sperm, Natural Winter	63 @65
Sperm, Bleached Winter	65 @67
Tallow, Prime	48 @49
Whale, Crude	@..
Whale, Natural Winter	46 @47
Whale Bleached Winter	48 @49
Menhaden, Brown, Strained	31 @32
Menhaden, Light Strained	32 @33
Menhaden, Bleached Winter	34 @35
Menhaden, Ex Bleached Winter	36 @37
Menhaden, Southern	20@..
Cocoanut, Ceylon	5¾@ 6½
Cocoanut, Cochin	6½@ 6¾
Cod, Domestic	38 @39
Cod, Newfoundland	39 @40
Red Elaine	43 @44
Red Saponified	₱ ℔ 5½@ 5¾
Olive, Italian, bbls	47 @ 51
Neatsfoot prime	54 @..
Palm, prime, Lagos	₱ ℔ 5½@ 6

Mineral Oils.

Black, 20 gravity, 25@30 cold test	₱ gal. 13 @14
Black, 29 gravity, 15 cold test	14 @15
Black, Summer	13 @14
Cylinder, light filtered	20½@21½
Cylinder, dark filtered	18½@19½
Paraffine, 903-907 gravity	15 @15½
Paraffine, 903 gravity	14 @14½
Paraffine, 885 gravity	11½@12½
Paraffine, red	14 @15½

In small lots ½¢ advance.

For the Table of "Current Metal Prices" see the First Issue of Every Month.